(Penna.)

Gleanings from Nature
Nos. 1-5 and 2 suppls.
1898-1910.

by
J. Warren Jacobs

Gleanings From Nature,

No. 1.

OOLOGICAL ABNORMALITIES.

J. Warren Jacobs.

672
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1898
Birds

GLEANINGS

FROM NATURE.

No. I.

OOLOGICAL ABNORMALITIES,

— By —

J.oseph WARREN JACOBS.

Illustrated.

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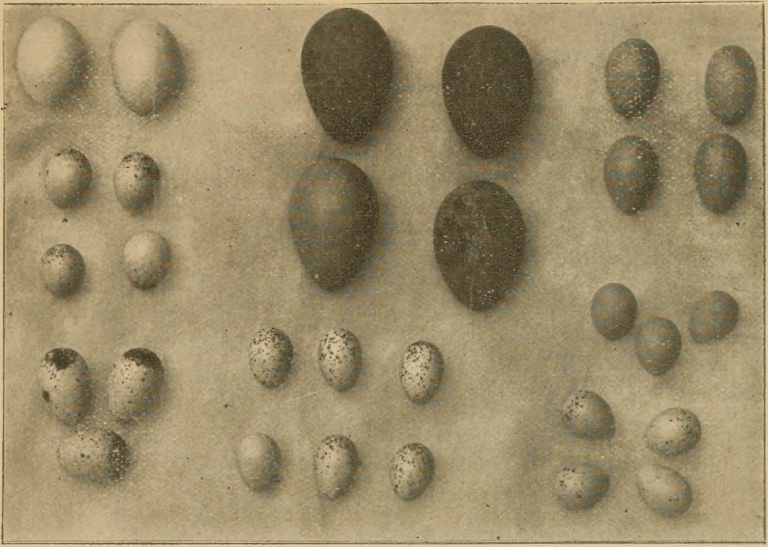
1898.

GLEANINGS FROM NATURE.—A series of pamphlets based chiefly on the author's research in ornithology and oology and published from time to time as accumulating material and data permits. Titles of future numbers and their dates of publication will be formally announced in the ornithological magazines.

THE AUTHOR.

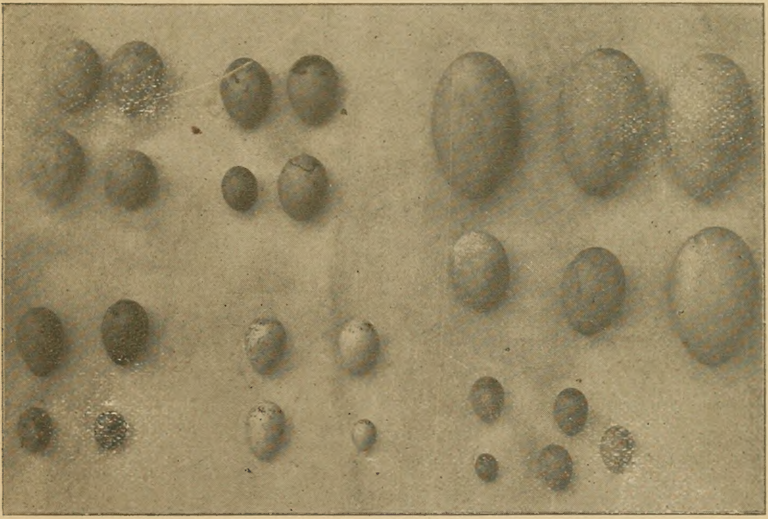
PLATE I.



I. ABNORMAL COLORATION.

Whip-poor-will (1). American Crow (8). Rose-breasted Grosbeak (12)
Kentucky Warbler (15). Barn Swallow (14) Green-crested Flycatcher (4)
Cactus Wren (19). Phoebe (2).

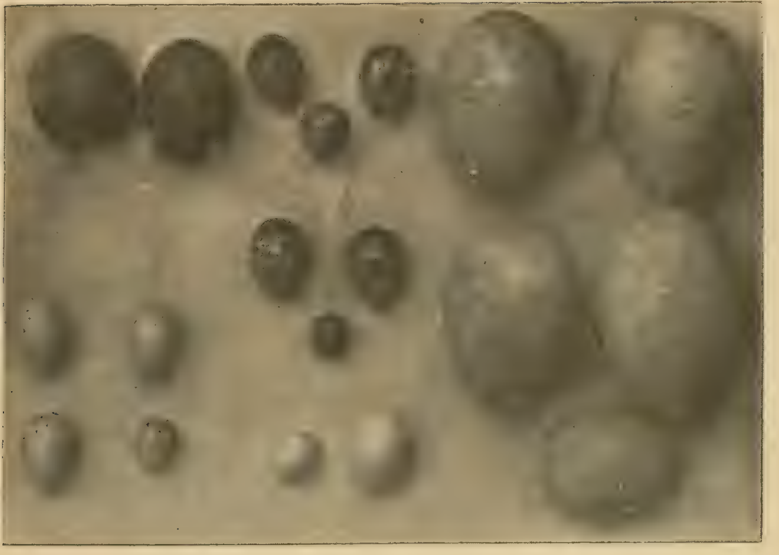
PLATE II.



II. ABNORMAL SIZE.

Bendiers Thrasher (57). Red-winged Blackbird (41). American Eared Grebe (24)
Cedar Waxwing (52). Maryland Yellow-throat (55). Verdin (59).

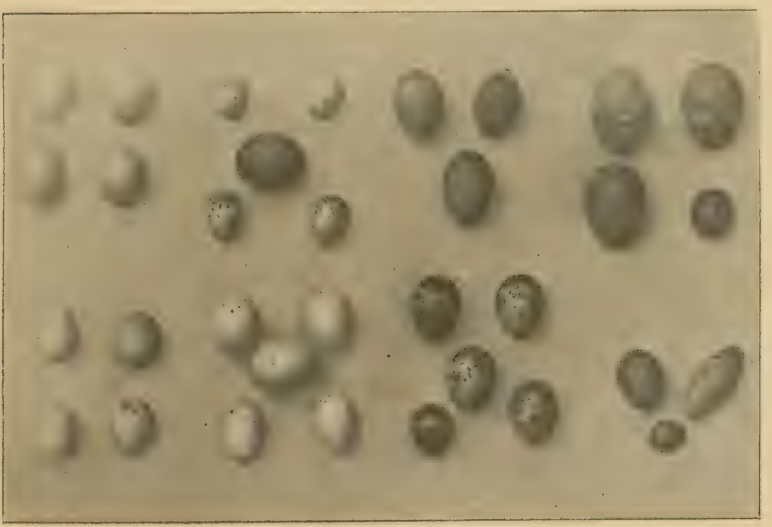
PLATE III



IV. ABNORMAL SIZE AND SHAPE.

American Crow (79). *Cardinal* (84). *Wood Ibis* (69).
Abert's Towhee (82). *Cardinal* (83).
Mourning Dove (72).

PLATE IV.



ABNORMAL.

VI Shape and Coloration.—V. Size and Coloration.—VII. Size, Shape and Coloration.

Cedar Waxwing (100). *Cowbird* (98). *Pine Grosbeak* (93). *American Robin* (109).
Cliff Swallow (99). *Cowbird* (97). *Song Sparrow* (94). *Song Sparrow* (103).

INTRODUCTION.

Although the first number of this series of pamphlets was announced to appear about the close of 1896, unavoidable circumstances retarded the work several months; but this delay has not been without its beneficial results, for the time thus extended has enabled the author to gather much additional material which has been of great value in the preparation of this paper.

Over one hundred sets of eggs, each containing one or more abnormal specimens, have been brought together along with the copious notes appertaining thereto. Care has been taken to incorporate in the paper only such notes as have been properly authenticated and are based wholly on abnormal sets in the author's possession.

To my many ornithological friends who have kindly aided me in this work, I wish to extend my sincere thanks, and earnestly solicit their fellowship and co-operation in the compilation of future numbers.

J. WARREN JACOBS.

Waynesburg, Pa.
Jan. 24, 1898.

Oological Abnormalities.

The study of oological abnormalism is one to which I have devoted much time, using as my subjects such specimens as came under my personal observation during systematic field work and those secured through correspondence. The collection thus brought together numbers one hundred and ten sets, aggregating four hundred and thirty-three eggs, of which two hundred and three are decidedly abnormal; some only in one particular characteristic while others show a combination of imperfections. Ninety-seven are abnormally colored, some possess a strangely tinted ground or are purely albino; many possessing a normal ground color are wholly or nearly immaculate, or are oddly marked with a superfluous abundance of color pigments. One hundred and twenty-two are defective in size, a large percentage of which are runts of variable patterns. Quite a number of monstrocities are present, and others which have one of their diameters normal are decidedly abnormal in the other. Departure from normal shape is noticeable in eighty-two of the specimens, many of which are of a spherical appearance but extremely long narrow specimens are numerous as well as abnormal pyriform types.

Just why a bird should finish off and lay a small malformed runt or an extremely large egg has never been fully understood by me, and equally perplexing is the unnatural absence of color pigment from some specimens or the abnormal presence of it on others. When I consulted my library, only meager statements were found; and these were applied in a general way, leaving the cause imperfectly defined; and while some explanations seemed plausible, their application was not consistent in all instances. Owing to these facts I have compiled the present paper from the evidence at hand, based on the specimens and data in my possession, giving such details as the facts in the various cases indicate.

COLORATION.—Of the ninety-seven eggs abnormally colored, fifty-eight are abnormal in coloration only, being in all other respects typical specimens. It is an interesting fact that the monstrocities are normally colored as well as a large percentage of the runts; the variations in the color of the remaining runts are only slight and the tendency is toward deeper shades, although a few lighter types exist.

Mr. O. W. Knight has kindly furnished some valuable observations on the prolific laying of a Pine Grosbeak (*Pinicola enuclator*) in captivity, together with one of the sets laid by the bird. These eggs were laid July 15, 16 and 17, 1896, and were the fifth laying of a total of six sets (19 eggs) laid by the bird during the season. In ground color and markings they vary from abnormally pale in the first and largest to a much darker shade in the third and last egg of the set. Mr. Knight carefully marked the eggs each day as they were deposited, so there can be no doubt about the trend of coloration. It would be interesting to know if it is a common thing for eggs to deepen in color as the laying progresses. In studying the individuality in the eggs of certain pairs of Red-tailed Hawks, Kentucky Warblers and others I have run across a few such instances, but by far the greater number of the sets showed the first egg to possess the darker shades and markings. Unfortunately the abnormal sets collected by me were stumbled upon after the laying was completed and consequently the trend of coloration, where it did exist, could not be determined. From the records at hand, it seems that the collectors of the sets herein treated, met with the same experience, except Mr. Knight who had the birds continuously under his watchful eye.

SIZE.—It is difficult, sometimes, to decide when the measurements of an egg are deficient in normal characteristics, so great is the variation in the size of eggs of many species.

Occasionally one will find monstrocities and runts in the same nest, and while neither seem to differ widely from the normal measurements, their own variations as an individual clutch are remarkable.

In point of cubical capacity, the largest egg in proportion to the normal is found in the set of Song Sparrow, No. 103, collected by William L. Kells, Listowell, Ont., Can. This egg, which measures 1.08x.54 inches, has a capacity nearly one-third greater than its normal companion. Another egg of this set is a tiny runt, measuring .46x .39 inch The runt in the set of Verdin, No. 59, and that in the set of Maryland Yellow-throat, No. 55, are the smallest in the collection; the former being about one-fourth and the latter one-fifth normal capacity. So far as I am aware these two runts are the smallest on record. I am always impressed with the fact that the majority of those abnormalities, defective in size, are strikingly similar to normal specimens with simply an increased or decreased cubical capacity. The smallest runts in the collection are perfect miniatures of their normal companions, and many of the unusually large specimens increase proportionately in long and short diameters.

The following tabulated form will give the reader a clear conception of the difference in comparison between the normal and abnormal sizes. The average sizes and other measurements, unless otherwise stated, are ascertained from series in my collection:—

Name of Species.	Normal Eggs.			Abnormal Eggs.	
	No. of Eggs Measured.	Sets Represented.	Av'age size (Inches.)	Size (In.)	No. in Set Descript'ns
American Eared Grebe	12	3	1.73x1.21	1.11x .83	24
				1.05x .79	24
Western Gull,	3	1	2.84x1.95	2.65x1.62	102
Franklin's Gull,	6	2	2.05x1.44	2.38x1.37	65
				2.32x1.38	65
Least Bittern,	7	2	1.19x .91	.77x .67	70
Little Blue Heron,	4	1	1.79x1.29	.85x .74	71
Bl'k-crowned Night Heron,	10	3	2.10x1.49	1.75x1.33	91
				1.65x1.27	91
Valley Partridge,	17	1	1.17x .94	.69x .59	25
				.76x .63	25
Mourning Dove,	24	12	1.12x .86	.68x .64	72
				1.00x .78	26
				.97x .76	26
Marsh Hawk,	9	2	1.78x1.44	1.69x1.30	27
				1.67x1.28	27
				1.64x1.32	27
				1.60x1.32	27
				1.94x1.49	73
Red-tailed Hawk,	141	66	2.33x1.87	2.12x1.59	28
American Long-eared Owl,	8	2	1.63x1.33	1.72x1.43	29
Belted Kingfisher,	92	15	1.34x1.07	1.00x .84	30
Red-headed Woodpecker,	10	2	.98x .74	.70x .62	74
				1.07x .70	75
				1.06x .67	75
				1.06x .70	75
California Woodpecker,	14	3	1.00x .77	.70x .59	32
				.88x .66	33
Flicker,	85	13	1.08x .85	1.41x .93	76

Red-shafted Flicker,	20	3	1.15x .87	.89x .64	35
				.89x .69	34
Phoebe,	144	32	.76x .58	.89x .65	36
Wood Pewee,	47	17	.73x .54	.66x .56	77
				63x .56	77
Prairie Horned Lark,	8	2	.84x .62	.71x .66	78
				.94x .70	78
Blue Jay,	13	3	1.04x .83	1.26x .89	37
American Crow,	149	33	1.65x1.14	1.88x1.25	38
				1.50x1.08	39
				1.43x1.38	79
				1.28x .96	40
Red-winged Blackbird,	71	19	.96x .70	.60x .47	41
Bi-colored Blackbird,	11	3	.95x .72	.56x .49	80
Bronzed Grackle,	44	10	1.15x .85	.94x .74	42
				.93x .74	42
				.89x .72	42
Purple Finch,	5	1	.81x .60	.74x .52	43
Vesper Sparrow,	38	10	.81x .60	.68x .52	44
Western Chipping Sparrow,	8	2	.67x .48	.48x .38	45
Song Sparrow,	140	32	.77x .60	.50x .42	104
				.46x 39	103
				1.08x .54	103
				.65x .52	94
				.57x .43	95
Heerman's Song Sparrow,	14	4	.80x .60	.65x .48	46
Towhee	55	16	.91x .71	.76x .67	81
				.76x .65	81
				.77x .65	81
Abert's Towhee,	9	3	.96x .70	.69x .56	82
Cardinal	71	23	.99x .73	.80x .56	47
				.88x .65	48
				.60x .50	83
				.75x .62	84
				1.04x .68	85
				1.07x .67	85
				1.11x .64	85
Indigo Bunting,	95	29	.77x .56	.83x .57	49
				.70x .53	49
				.67x .51	49
Scarlet Tanager,	44	14	.92x .65	.79x .64	86
Barn Swallow,	32	7	.77x .55	.68x .48	50
Bank Swallow,	22	4	.70x .51	.60x .43	51
				,64x .53	87
				,64x .52	87
				66x .52	87

Cedar Waxwing,	30	7	.85x .61	.90x .59	105
				.99x .61	105
				.96x .61	105
				.51x .43	52
				.59x .46	52
California Shrike,	7	1	1.03x .72	.58x .50	106
				.50x .39	106
Red-eyed Vireo,	56	19	.82x .58	.66x .46	53
Worm-eating Warbler,	41	11	.72x .56	.80x .52	88
Yellow Warbler,	46	11	.67x .50	.56x .41	107
				.56x .41	107
				.49x .39	107
				.62x .39	107
Kentucky Warbler,	121	31	.74x .58	.59x .45	54
Maryland Yellow-throat,	51	13	.71x .52	.41x .32	55
Hooded Warbler,	17	5	.70x .54	.79x .53	89
American Redstart,	37	11	.65x .50	.60x .51	90
				.59x .51	90
				.58x .50	90
				.56x .49	90
				.60x .48	108
				.59x .51	108
				.59x .52	108
				.61x .51	108
Brown Thrasher,	48	12	1.07x .78	.96x .59	56
House Wren,	6	1	.65x .49	.56x .40	58
				.51x .39	58
Verdin,	7	2	.59x .44	.37x .29	59
Russet-backed Thrush,	16	4	.88x .67	.79x .63	60
				.79x .63	60
American Robin,	67	19	1.12x .81	.64x .55	109

Name of Species.	Normal Eggs.		Abnormal Eggs.	
	Authority.	Av'age size (Inches)	Size.—(In.)	No. in Set, Descript'ns
Double-crested Cormorant,	Davie,	2.18x1.43	2.76x1.42	66
Gadwall.	Davie,	2.09x1.57	1.33x1.12	67
Shoveller,	Coues,	2.10x1.50	1.56x1.05	68
Wood Ibis,	Coues,	2.75x1.75	1.69x1.35	69
			2.40x1.75	69
			2.30x1.70	69
			2.35x1.75	69

Gambel's Partridge,	Bendire,	1.24x .94	.65x .51	92
Cabanis' Woodpecker,	Bendire,	.98x .73	.87x .67	31
			.73x .57	31
			.72x .56	31
Pine Grasbeak,	Coues,	1.05x .75	.93x .64	93
			.87x .63	93
			.83x .59	93
Bendire's Thrasher,	Davie,	1.02x .74	.81x .66	57

Contour.—"The short diameter, corresponding to the calibre of the oviduct, is less variable than the long axis; for when the quantity of food-yelk and white upon which the difference in bulk depends, varies with the vigor of the individual, the scantiness or redundancy is expressed by the shortening or lengthening of the whole mass."—Coues' Key, Page 224. If this law held good would not all runt eggs have a more nearly spherical shape; and would not the short diameter be more nearly normal? Oologists who have handled freak eggs, doubtless recall how closely many runts resembled the normal eggs in contour. The same may be said of the monstrocities, having a greater short diameter as well as an increased long axis.

Under head of "Descriptions of sets" (No. 79, and figured in plate III) is described a set of two eggs of the Crow, one of which is almost a perfect sphere, measuring 1.38x1.43 inches,—a difference of .05 of an inch, which is found only by a most careful application of the calliper. The other egg which measures 1.22x1.56 inches, has a short diameter slightly greater and a long diameter less than the average measurement of 149 eggs, in my series, which is 1.65x1.14 inches. As the capacity of the round egg is greater than that of its normally shaped companion, and as the capacity of either is greater than the average specimen, who can advance a satisfactory explanation for the phenomenon?

A careful study of "Description of Sets" will disclose the fact that a number of these abnormalities are long narrow specimens with a compressed short diameter, and probably the best example of this peculiarity is found in the set of Cardinal, No. 85, whose measurements are as follows:—1.04x .68, 1.07x .67 and 1.11x .64 inches, while the normal average is .99x .73 inch. Other good examples of this character are described under Nos. 88 (Worm-eating Warbler,) 74, (Red-headed Woodpecker) and 65, (Franklin's Gull), but after all there are enough monstrocities of typical contour to offset these.

Time of Deposition.—The importance of this subject is seen when we consider its value in relation to some theories which have been advanced on the causes of abnormal eggs. Frequent statements seen in print support the theory that abnormalism is due to over-production—the female being forced to lay an unusually large number of eggs by being frustrated in her first attempt to incubate. Now I find this apparently true in some instances, but the rule cannot be applied to all, nor even, with any degree of certainty, to the majority of cases. It also seems reasonable, at first thought, to believe that over-production would invariably bring about this result, but I am inclined to view it in a different light. It probably depends upon our interpretation of the term over-production; if "excessive laying" expresses it, then the second set of eggs of certain species which habitually rears but one brood annually may be considered an over-production; but those birds which annually rear more than a single brood must be accorded a larger normal laying.

There are several instances on record where the common Flicker (*Colaptes auratus*), has been subjected to long continuous laying with various normal and abnormal results, which go to show that some individuals are able to withstand this excessive laying, while others of the same species, thus subjected, terminate abnormally.

With a view of ascertaining what effect the continuous laying would have on the Bluebird (Sialis sialia) I erected a box for a pair of these birds that came to our premises early in the spring of 1886. They immediately took possession, built a nest and deposited five eggs which I took, as I did also three of the four subsequent sets laid; the last set I left for the birds to hatch. These eggs—twenty-one in number—were all normal and of uniform size, shape and color. The laying of these five sets and the time intervening occupied about thirty-five days.

Another case of the continuous laying of the Bluebird, but which resulted differently, is described in "Descriptions of Sets" number 22; in this the color abruptly changed from normally pale blue in the first to *pure white in the second clutch.*

Whatever the ultimate results of over-production may be I am prepared to assert from personal observations that many abnormalities are brought about by causes far removed from that of over-production. These examples are found among sets of the first laying, which, as a matter of fact, cannot be attributed to over production. Of the one hundred and ten sets treated in this paper, thirty-nine are known to be first layings and twenty-three others are believed to be firsts but no positive evidence of the fact has been established.

The following groups have been arranged, showing the order in which the sets were laid; the grouping and numbering are arranged to conform with that of "Descriptions of Sets."

FIRST LAYINGS.

I.—COLORATION.

1. Whip-poor-will.
2. Phœbe.
3. Wood Pewee.
4. Green-crested Flycatcher.
5. “ “ “
6. “ “ “
8. American Crow.
10. Meadowlark.
13. Indigo Bunting.
16. Yellow-breasted Chat.
20. Blue-gray Gnatcatcher.

II.—SIZE.

24. American Eared Grebe.
25. Valley Partridge.
28. Red-tailed Hawk.
30. Belted Kingfisher.
38. American Crow.
39. “ “
42. Bronzed Grackle.
47. Cardinal.
53. Red-eyed Vireo.
54. Kentucky Warbler.
55. Maryland Yellow-throat.
58. House Wren.

III.—SHAPE.

62. Field Sparrow.
63. Bank Swallow.
64. Yellow-breasted Chat.

IV.—SIZE AND SHAPE.

65. Franklin's Gull.
63. Double-crested Cormorant.
67. Gadwall.
75. Red-headed Woodpecker.
77. Wood Pewee.
78. Prairie Horned Lark.
84. Cardinal.
86. Scarlet Tanager.
88. Worm-eating Warbler.
87. Bank Swallow.
90. American Redstart.

V.—SIZE AND COLORATION.

(None.)

VI.—SHAPE AND COLORATION.

(None.)

VII.—SIZE, SHAPE AND COLORATION.

108. American Redstart.

VIII.—SHELL TEXTURE.

110. Yellow-breasted Chat.

———o———

PROBABLY FIRST LAYINGS.

I.—COLORATION.

11. Bronzed Grackle.
14. Barn Swallow.
23. Bluebird.

II.—SIZE.

26. Mourning Dove.
29. American Long Eared Owl.
41. Red-winged Blackbird.
43. Purple Finch.
45. Western Chipping Sparrow.
51. Bank Swallow.
59. Verdin.

III.—SHAPE.

(None.)

IV.—SIZE AND SHAPE.

68. Shoveller.
69. Wood Ibis.
71. Little Blue Heron.
73. Marsh Hawk.
74. Red-headed Woodpecker.
76. Flicker.
85. Cardinal.
89. Hooded Warbler.

V.—SIZE AND COLORATION.

91. Black-crowned Night Heron.
92. Gambel's Partridge.

VI.—SHAPE AND COLORATION.

96. American Herring Gull.
99. Cliff Swallow.
101. Yellow-breasted Chat.

VII.—SIZE, SHAPE AND COLORATION

(None.)

SECOND OR LATER LAYINGS.

I. -COLORATION.

15. Kentucky Warbler (2nd.)
22. Bluebird (2nd.)

II.—SIZE.

31. Cabanis' Woodpecker (3rd.)
36. Phœbe (2nd.)

III.—SHAPE.

(None.)

IV.—SIZE AND SHAPE.

72. Mourning Dove (2nd.)
80. Bi-colored Blackbird (2nd.)
81. Towhee (2nd.)

V.—SIZE and COLORATION.

93.—Pine Grosbeak (5th.)

VI.—SHAPE AND COLORATION.

(None.)

VII.—SIZE, SHAPE AND COLORATION.

102. Western Gull (?)

PROBABLY SECOND OR EVEN LATER LAYINGS.

I.—COLORATION.

7. American Crow.
9. Red-winged Blackbird.
12. Rose-breasted Grosbeak.
17. Yellow-breasted Chat.
18. Palmer's Thrasher.
19. Cactus Wren.
21. American Robin.

II. SIZE.

27. Marsh Hawk.
32. California Woodpecker.
46. Heerman's Song Sparrow.
48. Cardinal.

33. California Woodpecker.
34. Red-shafted Flicker.
35. " " "
37. Blue Jay.
40. American Crow.
44. Vesper Sparrow.
49. Indigo Bunting.
50. Barn Swallow.
52. Cedar Waxwing.
56. Brown Thrasher.
57. Bendire's Thrasher.
60. Russet-backed Thrush.

III.—Shape.

61. Blue Jay.

IV.—Size and Shape.

70. Least Bittern.
79. American Crow.
82. Abert's Towhee.
83. Cardinal.

V.—Size and Coloration.

94. Song Sparrow.
95. Song Sparrow.

VI.—Shape and Coloration.

100. Cedar Waxwing.

VII.—Size Shape and Coloration.

103. Song Sparrow.
104. " "
105. Cedar Waxwing.
106. California Shrike.
107. Yellow Warbler.
109. American Robin.

Omitted From Above List.

97. Cowbird.
98. Cowbird.

Sets in which these Cowbird's eggs were found were first layings.

Age of Females.—Owing to the great diffiiculty of determining the age of the nesting female, but little data has been gathered throwing light upon this subject. While birds of immaturity may account for many abnormalities, enough facts have been gleaned to show that adult females will also produce them.

The following incidents are based on individuality of the eggs, certain peculiar habits of the birds and their tenacity to return annually to the same location to nest.

In the Bluebird case, numbered 22 in "Descriptions of Sets" and mentioned in tbe preceding topic, the birds had for the four preceding years, at least, nested in the same post. Although I took but one of these sets, I remember the eggs from year to year showed striking individuality in point of color, which was of the palest tint seen in what might be called normal color for this species. A peculiar habit of this bird, when flushed from the nest, was to fly direct to one of three or four posts in a particular part of the fence surrounding the lot, and about fifty yards distant from the nest, although the fence was of uniform construction, the posts projecting above the top board and a large number of them being as easy of access. The post in which the nest was placed stood alone in the meadow, a few yards from the fence. Within a radius of two hundred yards were a half dozen unoccupied homes of Woodpeckers, two hollow fence posts and a crevice in the side of a stump--all likely sites for Bluebird's nests. One of these holes (a Flickers) about ten feet up in the side of a locust tree was occupied later for a third laying, the post in the meadow having been split down probably by cattle that frequently rubbed against it. The third laying was not discovered by me until the young were nearly ready to leave the nest. Since that year (1893) no Bluebirds have nested in the immediate vicinity.

In 1893 an individual pair of Red-tailed Hawks (*Buteo borealis*), which had lingered in a small wood in the head of a hollow in early spring, repaired an old Cooper's Hawk's nest and deposited therein two eggs. These which I collected on April 23, were rather small, but seemed to be within the limits of normal specimens. Again in 1894 I observed the birds a number of times in the same wood and early in April they began constructing a nest far up in a large white oak, using an old delapidated Crows' nest for a foundation. April 21, the old bird having apparently commenced her duties of incubation, I ascended to the nest and took the two eggs which it contained. These ("Descriptions of Sets," 28) are strikingly similar to the former set in shape and coloration but in size are somewhat smaller, one being a decided runt.

A characteristic of these birds was to show immense anxiety when I visited their domain. The male was first to discover me from his favorite perch in the tops of the trees of a small sparsely wooded tract about three hundred yards farther down the hollow. With a shrill scream he would spread his wings and flap lustily to the upper woods where his mate joined him in a series of circling until a point beyond gun shot was reached, then by a circuitious route descended slowly to the lower wood, alight in the tree tops and continue their shrill screams. These actions were noted several times both seasons.

Another case is that of the Cardinal described at length in "Descriptions of Sets" (Nos. 83 and 84). In this case the first abnormal set was laid in 1888, which, judging from the date (May 27) might have been a second or even later laying. However, I had, several times previously, investigated the ground pretty thoroughly and don't see how a nest so easily detected as a Cardinal's could have escaped my observation. During the two succeeding years I resided at Pittsburg, Pa., spending most of my time with the birds of Allegheny county, consequently was cut off from further observation on this pair of Cardinals until 1891 when I again made Waynesburg my permanent residence. On May 5th., of that year, I took a slightly incubated abnormal set from a nest in the thicket along the creek bank not far from the former site, which I firmly believe were the product of the same female, so precise are their characteristics. Since 1891 I have given the birds, nesting in the lower part of the field, but little attention, the place having become a common resort for the everlastingly bothersome small boys who harrass the birds much.

From my observations on these three pairs I would infer that abnormalism is of frequent occurrence with them.

In these particular cases, two substantial causes for abnormalities are apparent—that of weakness or temporary loss of certain functions of the reproductive organs, or of old age of the birds. The Bluebird's eggs which verged on albinism from year to year, became true albinos when circumstances compelled the old bird to lay swo sets in rapid succession, although two broods is the common thing with the species here. The Red-tail's eggs which were unusually small one year were still smaller the next —one being an undeniable runt. The Cardinal's eggs carried with them unmistakable individuality in abnormal as well as normal respects, although three years intervened between the laying of the sets.

Just whether the females were very aged I cannot say, but certainly they were not immature birds as my observations on the breeding of the former and latter cover a number of years, and in the second case the birds were in the adult plumage at the beginning of my acquaintance with them.

From Mr. Knight's observations on the oological performances of his caged Pine Grosbeak during 1896 I draw the following which would strengthen the theory that abnormalities are due to weakness of, or temporary loss of certain functions of the reproductive organs; and is also of frequent occurrence with certain individuals.

Six sets were laid, in all nineteen eggs, during the season. The dates on which they were laid and their respective measurements are as follows:

First Set.	Third Set.	Fifth Set.
May 18, .89x.69	June 12, *.62x.41*	July 15, .95x.64
" 19, .87x.65	" 13, .96x.66	" 16, .87x.63
" 20, *.85x.64*	" 14, .91x 65	" 17, *.83x.59*
" 21, .92x.64		
Second Set.	**Fourth Set.**	**Sixth Set.**
June 4, .97x.68	June 27, .94(?)x.64 (dented at end)	July,29, *.86.x65*
" 5, .92x.66	" 28, .87x.64	" 30, .90x.63
" 6,(brok'n)	" 29, *.87x.62*	" 31, .90x.61

All of these eggs are below the average size, several being runts—one quite small. The measurements of the smallest egg of each complete set is given in italics to readily illustrate the status of laying. Thus it will be seen that the smallest egg of the whole series was the commencement of the third set and the next smallest size was the ending of the fifth set ("Descriptions of Sets," No. 93). The largest egg was the fifth one laid, and the next largest was the ninth—this one following the smallest specimen. It is also of interest to observe that the eighteenth and nineteenth eggs are larger than the first, second and third ones laid.

FERTILITY OF CONTENTS.—Close observations on this subject seem to have been overlooked by many of the oologists who contribute material for this booklet. Many observers seemed content to let the matter of incubation rest as "fresh" if the normal eggs so proved, or "slight" if that stage prevailed. In this respect, much information which would otherwise have proved invaluable in the preparation of this paper has been lost trace of in the passing of the eggs from the nest to the cabinet. However a careful perusal of "Descriptions of Sets" will show that much valuable data on the subject, has been taken, from which a conclusion must be reached that while a majority of abnormalities—except those abnormal in coloration only—are infertile, many others are fertilized and incubation progressing. Generally the smaller runts contained no yolk; but in most of those personally examined by myself, where this proved true, a small streak of yellowish substance existed. Those abnormally colored eggs which were typical in all other outward appearances, were found to possess healthy contents—fresh ones had fertilized yolks, and incubated ones had vigorous embryos—with but few exceptions, and these were of no more frequent occurrence than found among sets of normal eggs.

PECULIARITIES OF SHELL.—A careful study of *shell texture* discloses a number of departures from the normal types. Remarks on these peculiarities are given under their respective set numbers in "Descriptions of Sets" and need but little additional touch here. It is worth while to note that thick and thin shelled runts occur in about equal proportions, while monstrocities seem to possess a shell of normal thickness, 'though sometimes a very frail one is seen.

Crevices and thin porous patches and streaks are seen in the shells of some, and sharp, burr-like points and thick warty surfaces are also noticed. One set exhibiting the latter peculiarity is given a separate place in "Descriptions of Sets" under the head of "Shell Texture." This, a set of Yellow-breasted Chat (*Icteria virens*), was normal in all other particulars.

DESCRIPTIONS OF SETS.

NOTE.—In most cases throughout the following descriptions Ridgway's Nomenclature of Colors has been used as a guide to coloration and shape. Italics denote abnormal points.

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I.—ABNORMAL COLORATION.

1. Antrostomus vociferus. WHIP-POOR-WILL. (PLATE I, No. I.)—May 18, 1887. Collected by J. Warren Jacobs, Greene Co., Pa. Two fresh eggs, pure white, *unmarked*, save for two small faint lavender-gray spots on one. Elliptical oval; 1.21x .88 1.16x .88 inches.

2. Sayornis Phœbe. PHŒBE. (PLATE I, No. 2).—May 6, 1894. Collected by J. Warren Jacobs, Greene Co., Pa. Four eggs containing large embryos. Pale creamy-white, with a *thickly speckled wreath* of cinnamon-rufous around the larger end of each, and not distinguishable from some specimens in a series of Western Flycatcher (*Empidonax difficilis*) in my collection. .74x.58, .75x.58, .74x.58 and .78x.56 inch.

Of a series of ninety eggs (21 sets) now before me, only twenty-five have have any traces of markings, and these only faintly so. It is safe to say that the two lighter marked specimens of the present set have as much color pigment as all the other marked eggs in the series. All the dotted eggs in my collection have a creamy tinted ground, while the immaculate ones are either pure white or ashy tinted.

3. Contopus virens. WOOD PEWEE.—June 14, 1897. Collected by J. Warren Jacobs, near Waynesburg, Pa. Three eggs containing small embryos; two are normally rich cream, heavily marked with blotches of claret and chestnut-brown, heliotrope and pale lavender in a band around the larger ends; the third has a *buff-pink* ground on the ends which *intensifies as it approaches the band of blotches where it blends evenly into the brown*: .78x.57, .74x.58 and .75x.58 inch.

4. Empidonax virescens. GREEN-CRESTED FLYCATCHER. (PLATE I, No 4).—June 3, 1893. Collected by J. Warren Jacobs, Greene Co., Pa. Three fresh eggs, rich creamy-buff, *immaculate*. Elliptical ovate; .72x.57, .72x.55 and .72x.57 inch.

5. Empidonax virescens. GREEN-CRESTED FLYCATCHER. —June 8, 1894. Collected by J. Warren Jacobs, Greene Co., Pa. Three eggs containing medium embryos, pale creamy ground, *almost devoid of markings*, few pin points of liver-brown at random on the larger ends. Elliptical ovate; .68x53, .71x54 and .70x.53 inches.

6. **Empidonax virescens.** GREEN-CRESTED FLYCATCHER.—June 1, 1897. Collected by J. Warren Jacobs, Greene Co., Pa. Three slightly incubated eggs, ground color *pure white*, speckled, sparingly on the larger ends, with burnt sienna. Elliptical ovate; .72x.53, .71x.53 and .71x.53 inch.

7. **Crovus americanus.** AMERICAN CROW.—May 12, 1892. Collected by J. Warren Jacobs, Greene Co., Pa. Originally three slightly incubated eggs;—one broken in blowing;—pale bluish-green *almost devoid of markings*, which are of black and faint chromium green on smaller end of one and on both ends of the other. Ovate, 1.62x1.14 and 1.52x1.13 inches.

8. **Crovus americanus.** AMERICAN CROW. (PLATE I, No. 8).—April 10, 1892. Collected by J. Warren Jacobs, near Waynesburg, Pa. Four slightly incubated eggs; nile blue, two very heavily spotted and streaked with broccoli brown and grayish almost concealing the ground color; third is moderately marked (for this species) with minute specks of broccoli brown over which is diffused bold blotches of same and dark umber, becoming confluent in a band *running spirally around the shell* and making one and a half circuits from the smaller to the greater end; fourth is *nearly immaculate*, having only a few faint yellowish streaks, hardly noticeable. Ovate; 1.66x1.14, 1.60x1.1.14, 1.60x1.14 and 1.64x1.12 inches. Many small granulations on small end of unmarked specimen.

9. **Agelaius phœniceus.** RED-WINGED BLACKBIRD.—June 14, 1894. Collected by R. W. Johnson, Rice Lake, (near Port Hope,) Ont., Can. One fresh egg, pale bluish-green, *immaculate*. Elliptical ovate; 1.05x.70 inch.

10. **Sturnella magna.** MEADOWLARK.—June 10, 1896. Collected by R. T. Anderson, Aylmer, Ont., Can. Five fresh eggs; white, graduating in markings from one typically blotched and dotted specimen through two types of sparingly dotted and one *faintly speckled* to *almost immaculate* in the fifth specimen. The color pigment throughout is a soft or subdued reddish brown and helitrope purple, becoming almost indistinguishable on the last egg. Elliptical ovate; 1.11x.82, 1.14x.87, 1.05x.86 1.06 x.83 and 1.07x.82 inches. Thin frail shells.

11. **Quiscalus quiscula æneus.** BRONZED GRACKLE.—May 28, 1886. Collected by William L. Kells, Listowell, Ont., Can. Four fresh eggs, quite unique in color; three have a *raw umber* ground, almost completely covered with blotches of tawney-olive, over which is a diffusion of seal brown and black scrawls, lines and daubings. The fourth is *nile blue almost immaculate*, the few markings being of subdued lavender blurs and

minute specks of cinnamon, chiefly in form of a wreath around the greater end. Ovate; 1.08x.80, 1 11x.82, 1.08x.81 and 1.14x.84 inches.

12. Habia ludoviciana. ROSE-BREASTED GROSBEAK. (PLATE I, No. 12).—June 5, 1895. Collected by W. J. Wirt, Gaines, N. Y., and secured from E. H. Short, Albion, N. Y. Four fresh eggs, pale bluish-green,—quite like freshly blown eggs of the Bluebird (*Sialia sialis*); *Two are wholly immaculate and two nearly so*; these being marked, chiefly on the larger ends, with faint russet-brown. Elliptical ovate; .97x.68, .98x.66, .98x .68 and .98x.64 inch.

13. Passerina cyanea. INDIGO BUNTING.—May 24, 1896. Collected by J. Warren Jacobs, Greene Co., Pa. Three fresh eggs, *pure white*,—otherwise normal;—,72x.55, .74x.55 and .74x .55 inch.

14. Chelidon erythrogastra. BARN SWALLOW. (PLATE I, No. 14).—June 18, 1897. Collected by W. J. Wirt, Gaines, N. Y. Six highly incubated eggs; white, five are normally speckled with brown of varying shades and lavender, and one is *immaculate* save for two small specks on the larger end, .72x.54, .80x.55, .80x.54, .78x.55, .75x.55 and .75x.56 inch.

15. Goethlypis formosa. KENTUCKY WARBLER. (PLATE I, No. 15).—June 16, 1897. Collected by J. Warren Jacobs, near Waynesburg,Pa. Four eggs containing medium embryos; white, three are normally wreathed around the larger ends with cinnamon-rufous and heliotrope purple, while the fourth has only a very *small circular patch on the smaller end*; .78x.59, .76x.59, .69x .57 and .74x.60 inch. This is a second laying, the first set having been taken May 24, within a few yards of the present site.

16. Icteria virens. YELLOW-BREASTED CHAT.—May 26, 1891. Collected by J. Warren Jacobs, near Waynesburg, Pa. Four fresh eggs, *sparingly marked with unusually bold blotches* of lavender, heliotrope purple and reddish-brown, on the whole *closely resembling eggs of the Kingbird* (*Tyrannus tyrannus*). .96x .70, .99x.68, .93x.70 and .93x.69 inch.

17. Icteria virens YELLOW-BREASTED CHAT.—July 2, 1893. Collected by J. Warren Jacobs, near Waynesburg, Pa. Three fresh eggs; white, two are typically marked with reddish brown and lavender and one sparingly blotched with heliotrope purple and reddish brown, and except in size *cannot be distinguished from the average egg of the Kingbird.* .85x.66, .85x.68 and .87x.68 inch. This set was accompanied by an egg of the Cowbird (*Molothrus ater*.)

NOTE.—When considered together with a large series of this species, these five, which so closely resemble the eggs of the Kingbird, carry with them their own characteristics, departing from the usual type and standing out in bold relief among the three hundred and seventy-five eggs in the series.

18. **Harporhynchus curvirastris palmeri.** PALMER'S THRASHER.—June 18, 1893. Collected by Price and Wilbur, Ft. Lowell, Ariz. Two fresh eggs; pale bluish, one *almost immaculate*,—scanty markings barely perceptible,—the other is sparingly dotted with fine pin points of russet over entire surface. Elliptical ovate; .98 x .75 and 1.02 x .77 inches.

19. **Heleodytes brunneicapillus.** CACTUS WREN. (PLATE I. No. 19.)—June 10,1892. Collected by Ray L. Wilbur, Riverside, California. Three slightly incubated eggs,—very oddly colored; white, blotched and dotted with cinnamon—rufous, chestnut and heliotrope purple—former predominating,—*almost wholly in a well defined wreath around the larger ends*; on two becoming confluent in this respect, forming a *solid band around the shell*. Elliptical ovate; .98 x .68, .92 x .68 and .98 x .67 inch.

20. **Polioptila cærulea.** BLUE-GRAY GNATCATCHER.—May 18, 1891. Collected by J. Warren Jacobs, Greene Co., Pa. Five slightly incubated eggs; four are normally speckled—chiefly in form of an irregular wreath around the larger ends with fine dots of lavender and vinaceous-rufous, and one is *nearly immaculate, having only a few indistinct shell markings of faint lavender*. Elliptical ovate; .54x.43, .56x.45, .55x.44, .55x.46 and .56x.46 inch.

21. **Merula migratoria.** AMERICAN ROBIN.—May 29, 1893. Collected near Waynesburg, Pa. An interesting set had it been properly collected. A boy brought me the nest containing three eggs, stating that the fourth got broken. Of the remaining eggs a *heavily speckled one* was so badly crushed that it could not be preserved; the two specimens now before me are quite like typical Robin's eggs, except that *one is thickly dotted with fine specks of faint yellowish brown*; 1.02x.78 and 1.07x.78 inch.

22. **Sialia sialis.** BLUEBIRD.—May 21, 1893. Collected by J. Warren Jacobs, Greene Co., Pa. Six eggs, somewhat incubated; *pure white*, ovate and measure .84x.65, .82x.64, .79x.63, .79x .62, .86x.65 and .87x.64 inch. This is a second laying, I having taken the first on April 30,—six highly incubated eggs of the palest normal tint. The nest, which was in a lone post in a meadow, was used in previous years, but only once before did I find more than five eggs in it.

23. **Sialia sialis.** BLUEBIRD.—May 5, 1884. Collected by J. B. Canfield, Bridgeport, Conn., and secured from the E. H.

Short Collection. Four fresh eggs; *pure white, exhibiting before being blown a pinkish tint commonly seen in fresh eggs of the Woodpeckers and others.* Elliptical ovate; .87x.65, .84x.65, .88x.65 and .89x.64 inch.

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II.—ABNORMAL SIZE.

24. **Colymbus nigricollis californicus.** AMERICAN EARED GREBE. (PLATE II, No. 24).—June 30, 1896. Collected by Edmund Heller, Pine Lake, San Bernardino, Mts., Cal. Six eggs, incubation begun. A remarkable set; four of the eggs being above the average size, and two are interesting *runts* and very similar in size and shape. The four larger specimens are elongate ovate and the runts are elliptical oval; 1.89x1.16, 1.91x1.19, 1.80x1:18, 1.90x1.16, *1.11.83* and *1.05*x*.79* inches.

All the eggs of this set were covered with a brownish nest stain which readily washed off, leaving the shells a clear bluish-white color.

25. **Callipepla californica vallicola.** VALLEY PARTRIDGE May 12, 1894. Collected by Chester Crosby, Riverside, California, and secured from the Edmund Heller Collection. Sixteen fresh eggs, two of which are *runts*; short ovate, creamy or buffy-white ground marked as follows: 1 to 4 inclusive, marked over entire shell with small specks and heavy blotches and cloudings of chestnut and russet; 5 to 14 inclusive, heavily marked with fine minute dots of same materials, noticeably thickest on larger ends; *15 and 16* markings become confluent on smaller and larger ends respectively. Size in order described, 1.19x.90, 1.18x.92, 1.20x.92, 1.14x.90, 1.15x.96, 1.14x.96, 1.18x.96, 1.18x.93, 1.16x.96, 1.16x.96, 1.18x.98, 1.18x.93, 1.23x1.00, 1.17x.96, *.69*x*.59* and *.76*x*.63* inches.

26. **Zenaidura macroura.** MOURNING DOVE.—May 6,1897. Collected by R. T. Anderson, Aylmer, Ont., Can Two slightly incubated eggs, *considerably below average size, one being a decided runt.* White, oval and measure; *1.00*x*.78* and *.97*x*.76* inch.

27. **Circus hudsonius.** MARSH HAWK.—June 14, 1896. Collected by Edwin S. Bryant, Sweet Water Lake, N. Dak. Four *unusually small* eggs; incubation commenced; white, with slight greenish tint. Elliptical ovate; *1.69*x*1.30*; *1.67*x*1.28*, *1.64*x*1.32* and *1.60*x*1.32* inches.

28. **Buteo borealis.** RED-TAILED HAWK.*—April 21, 1894. Collected by J. Warren Jacobs, near Waynesburg, Pa. Two eggs, *very small* for this species; white, marked with blotches and

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* This is figured in Plate II, "Eggs of Native Pa. Birds."—See upper right hand set.

dots of faint ecru drab, becoming confluent in a wreath around the larger end of one and in a small circular patch on the smaller end of the other. Elliptical ovate; 2.28x1.73 and *2.12*x*1.59* inches.

A set of two eggs was taken from a nest in the same small wood last year (April 23, 1893), and is, undoubtedly, the product of the same female as the eggs are just like the above described set, except in size, being a little larger, measuring 2.29x1.76 and 2.36x1.80 inches; thus coming within limits of typical specimens.

29. **Asia wilsonianus.** AMERICAN LONG-EARED OWL.—May 18, 1896. Collected by Edwin S. Bryant, Benson Co., N. Dak., and secured from H. S. Sowers, St. Francisville, Mo. Four eggs, incubation commenced; white, slightly glossy; rounded oval in shape, and in size three are normal and one is *extremely large*, 1.57x1.37, 1.57x1.37, 1.58x1.36 and *1.72*x*1.43* inches.

30. **Ceryle alcyon.** BELTED KINGFISHER.—May 15, 1894. Collected by Benj. Hoag, Stephentown, N. Y. Seven glossy-white eggs, one of which is a *runt*; 1.36x1.10, 1.37x1.11, 1.40x1.12, 1.29x1.12, 1.39x1.08, 1.39x1.07 and *1.00*x*.84* inches.

31. **Dryobates villosus hyloscopus.** CABANIS' WOODPECKER.—June 1, 1890. Collected by Harvey M. Hall, near Riverside, California. Three fresh eggs; glossy-white, all below the average size, two being *runts*. This is the product of a female after being repeatedly robbed. Ovate; *.87*x*.67*, *.73*x*.57* and *.72*x*.56* inch.

The birds had been robbed twice before by some boys, but as Mr. Hall did not see the eggs he could not state positively as to their perfectness; however, he thinks they were normal as one of the boys was with him, when he collected this set, and seemed surprised at their small size.

32. **Melanerpes formicivorus bairdi.** CALIFORNIA WOODPECKER.—June 2, 1897. Collected by A. E. Bonds, Huachuca Mts., Ariz., and secured from the O. W. Howard Collection. Five fresh eggs, all under average size, one being a *runt and containing no yolk.* Oval to elliptical ovate—runt of former shape. Pure white; .92x.72, .93x.71, .94x.72 .92x.71 and *.70*x*.59* inches.

33. **Melanerpes formicivorus bairdi.** CALIFORNIA WOODPECKER.—June 10, 1897. Collected by A. E. Bonds, Huachuca Mts., Ariz., and secured from the O. W. Howard Collection. Four normal eggs in which incubation was slight, and one addled *runt containing no yolk.* Elliptical ovate,—runt slightly blunt ended; .98x.74, .98x.74, .96x.73, .98x.72 and *.88*x*.66* inch.

34. **Colaptes cafer.** RED-SHAFTED FLICKER.—June 9, 1897. Collected by A. E. Bonds, Huachuca Mts., Arizona, and secured

from the O. W. Howard Collection. Six fresh eggs; all are of uniform shape,—elliptical ovate,—but in size one is a decided *runt*; 1.12x.84, 1.12x.82, 1.06x.86, 1.07x.85, 1.07x.83 and *.89*x*.69* inches.

35. **Colaptes cafer.** RED-SHAFTED FLICKER.—June 29, 1888. Collected by Ralph Arnold, Pasadena, California. Six fresh eggs; glossy white, five are slightly under average size and one is a *runt*. In shape they exhibit considerable irregularity and vary from ovate in the runt to elliptical ovate in the largest specimen; 1.03x.80, 1.02x.80, 1.07x.79, 1.09x.78, 1.05x.79 and *.89*.x*64* inches.

36. **Sayornis phœbe.** PHŒBE.—May 11, 1897. Collected by J. Warren Jacobs, Greene Co., Pa. Five eggs, four of which were highly incubated normal eggs and one *enormously large*, freshly laid and seemingly fertile specimen. Normal eggs unmarked and short ovate in shape; abnormal specimen marked on larger end with numerous small blotches and specks of cinnamon; .80x.60, .79x.59, .81x.60, .77x.58 and *.89*x*.65* inch. An egg of Cowbird (M. ater) belongs to this set. It was perfectly fresh and fertile.

This is a second laying for this bird this year, as I took nest and four fresh eggs from the same rock on April 11.

37. **Cyanocitta cristata.** BLUEJAY.—May 25, 1897. Collected by Isaac E. Hess, Philo, Ill. Four fresh eggs, normally ovate, one *extremely large*. Olive-buff, marked with large blotches and spots of raw umber, wood - brown and light drab, distributed in the usual way, except on one where the browns are clustered around the smaller end, and the almost indistinguishable drab on the larger; 1.05x.79, 1.07x.79, 1.09x.84 and *1.26*x*.89* inches.

Speaking of the eggs of this species, Bendire in his "Life Histories of N. A. Birds" says: "The largest specimen in a series of 135 eggs in the U. S. National Museum measures 1.20x.85 inches."

38. **Corvus americanus.** AMERICAN CROW.—April 23, 1892. Collected by J. Warren Jacobs, near Waynesburg, Pa. Four fresh eggs, three of which are slightly below normal size, and one *extremely large*; the three are heavily clouded with olive-green, hair brown and light drab-gray over a malachite green ground, while the fourth is sparingly marked with same pigments, chiefly on larger end and over a pale or faded nile blue ground. 1.58x1.15, 1.64x1.14, 1.57x1.18 and *1.88*x*1.25* inches.

39. **Corvus americanus.** AMERICAN CROW.—April 24, 1897. Collected by W. J. Wirt, Gaines, N. Y. Six eggs, slightly

incubated; five considerably above the average size and one *runt*; pale or faded nile blue, the five normal specimens are marked with hair brown, olive-green and grayish, mostly on larger ends; runt is slightly marked with clove brown and drab chiefly on smaller end. Elongate ovate and ovate (runt) shape; 1.88x1.14, 1.91x1.16, 1.86x1.18, 1.91x1.18, 1.86x1.18 and *1.50*x*1.08* inches.

40. Corvus americanus. American Crow.—May 2, 1897. Collected by W. J. Wirt, near Gaines, N. Y. Five fresh eggs, one of which is a *runt*; light glaucous-green, heavily marked with blotches and specks of olive-green, hair brown and slate, chiefly on the larger ends of three (runt one of them) and on the smaller ends of two. Ovate; 1.63x1.15, 1.65x1.14, 1.59x1.15, 1.62x 1.14 and *1.28*x*.96* inches.

41. Agelaius phœniceus. Red-winged Blackbird.—(Plate II, No. 41.)—May 7, 1896. Collected by E. A. McIlhenny, Avery's Island, La. Four fresh eggs, one of which is a *runt*; pale bluish-green with grayish tint, marbled, lined and blotched with black, lilac-gray and brown of varying shades, mostly on the larger ends where on one a black line completely encircles the shell; .87x.66, .92x.69, .92x.67 and *.60*x*.47* inch.

42. Quiscalus quiscula æneus. Bronzed Grackle.—May 10, 1896. Collected by I. E. Hess, Black Slough, near Philo, Ill. Three *runts* of typical color and shape; light nile blue, marked after the usual type of this variety with black, drab-brown and stone color scrawls, dots and blotches, noticeably thickest on the larger end; *.94*x*.74*, *.93*x*.74* and *.89*x*.72* inch.

43. Carpodacus purpureus. Purple Finch.—June 1, 1896. Collected by Robert Smith, Millgrove, Ont., Can., and secured from the Benj. Hoag Collection. Four fresh eggs, one of which is a *runt*; nile blue (deep), marked, chiefly in form of an irregular wreath around the larger end with small blotches and specks of black, raw umber and ecru drab, the latter color, however, being entirely wanting on the runt. Elongate ovate; .81x.57, .84x.58, .82x.58 and *.74*x*.52*.

44. Poocætes gramineus. Vesper Sparrow.—June 3, 1897. Collected by W. J. Wirt, near Gaines, N. Y. Three normal and one *runt*; pale pea green, heavily marked with blotches of cinnamon, vinaceous and ecru drab, with here and there a speck or line of burnt umber. Elliptical ovate; .78x.63, .79x.62, .81x.62 and *.68*x*.52* inch.

45. Spizella socialis arizonae. Western Chipping Sparrow.—May 12, 1895. Collected by W. Parker, Yamhill Co., Oregon. Five eggs, one being a *runt*; incubation begun. Ground

color more nearly glaucous-green than emerald green, marked chiefly in form of a ring around the larger end, with black, burnt umber and heliotrope purple on the normal eggs. The runt is similarly marked but the heliotrope becomes brick red; .72x.53, .76x.53, .74x.52, .73x.52 and *.48*x.*38* inch. Elliptical ovate.

46. Melospiza fasciata heermanni. HEERMAN'S SONG SPARROW.—May 1, 1891. Collected by Ray L. Wilbur, Riverside, Cal. Four eggs; three normal and one *runt*; incubation begun. Pale bluish-green, marked with chestnut, vinaceous cinnamon and lavender gray, chiefly on the larger end of the three normal and on the smaller end of runt. Ovate; .78x.59, .78x.61, .79x.58 and *.65*x.*48* inch.

47. Cardinalis cardinalis. CARDINAL.—May 10, 1893. Collected by J. Warren Jacobs, near Waynesburg, Pa. Three eggs, one of which is a *runt*; incubation slight in the normal specimens; white with grayish tint, normally speckled with cinnamon rufous, ecru drab, heliotrope purple and pale lavender, chiefly on the larger end, where on one a distinct wreath is seen. Ovate; 1.01x.74, .97x.74 and *.80*x.*56* inch.

48. Cardinalis cardinalis. CARDINAL.—May 21, 1895. Collected by J. Warren Jacobs, Greene Co., Pa. Two normal and one *runt* egg; fresh; white, with faint greenish tint, blotched and dotted with russet, heliotrope and pale lavender, distributed pretty evenly over the surface, the largest blotches, however, are clustered on the greater end. Ovate; 1.00x.74, 1.00x.70 and *.88*x.*65* inch.

49. Passerina cyanea. INDIGO BUNTING.—August 3, 1892. Collected by J. Warren Jacobs, Greene Co., Pa. Three fresh eggs, exhibiting wide variation in size, one is *extremely large* and two *very small*,—for this species,—faint bluish white. Elliptical ovate; *.83*x.*57*, *.70*x.*53* and *.67*x.*51* inch.

50 Chelidon erythrogastra. BARN SWALLOW.—July 18, 1897. Collected by W. J. Wirt, near Ridgeway, Orleans Co., N. Y. Three normal and one *runt*; white, marked with pale lavender, heliotrope purple and cinnamon-rufous, chiefly in form of an irregular wreath around the larger end. On the normal specimens the blotches are of the usual type, but on the runt they are very minute. Ovate; .75x.51, .73x.52, .76x.52 and *.68*x.*48* inch.

51. Clivicola riparia. BANK SWALLOW.—May 16, 1894. Collected by R. W. Johnson, Port Hope, Ont., Can. Four eggs, all below the average size, one being a *rnnt*; white; two of the normal specimens are elliptical ovate, while others are ovate; .70x .49, .68x49, .67x.49 and *.60*x.*43* inch.

52. **Ampelis cedrorum.** CEDAR WAXWING. (PLATE II, No. 52).—July 9, 1893. Collected by J. W. Kitt, 9 miles north of Indianapolis, Ind., and secured from the Geo. W. Dixon Collection, Watertown, N. Dak. Two normal and two *runt* eggs; normally greenish stone, marked with numerous dots, blurs and specks of black, vandyke brown and lilac-gray, noticeably thickest on largest half of shell. Ovate; .89x.63, .82x.61, *.59*x*.46* and *.51*x*.43* inch.

53. **Vireo olivaceus.** RED-EYED VIREO.—June 13, 1895. Collected by C. F. Stone, Branchport, N. Y. Three fresh eggs; white, marked chiefly in form of ring around the larger end, with black and burnt umber specks and pin points. Ovate; .79x.56, .78x.54 and *.66*x*.46* inch.

54. **Geothlypis formosa.** KENTUCKY WARBLER.—May 19, 1895. Collected by J. Warren Jacobs, near Waynesburg, Pa. Five fresh eggs; four normal and one *runt*; white with a slight creamy tint, heavily speckled, chiefly in form of a wreath on the larger end, with bright cinnamon-rufous, heliotrope purple and pale lavender. *Runt contained no yolk.* Ovate; .76x.58, .73x.56, .72x.55, .69x.54 and *.59*x*.45* inch.

55. **Geothlypis trichas.** MARYLAND YELLOW-THROAT. (PLATE II, No. 55).—June 2, 1894. Collected by J. Warren Jacobs, near Waynesburg, Pa. Three slightly incubated normal eggs and one *infertile runt* (*yellowish vein intermixed with the white contents*); white, normally marked with specks, dots, small blotches and hair lines of black, vandyke brown, heliotrope and pale lavender, chiefly in form of an irregular wreath around the larger end of the normal specimens, and confined to a circular patch on the runt. Ovate; .73x.54, .77x.53, .76x.54 and *.41*x*.32* inch.

56. **Harporhynchus rufus.** BROWN THRASHER.—May 19, 1897. Collected by Isaac E. Hess, near Philo, Ill. Four eggs; three normal, in which incubation was advancing, and one *infertile runt*; white, with a slight greenish tint, almost completely covered with fine dots of cinnamon and faint ecru drab. Elliptical ovate; 1.10x.78, 1.10x.77, 1.10x.79 and *.96*x*.59* inches.

57. **Harporhynchus bendirei.** BENDIRE'S THRASHER. (PLATE II, No. 57).—May 29, 1896. Collected by Frank Bennett, Maricopa Co., Ariz., and secured from the R. A. Campbell Collection, Tucson, Ariz. Four fresh eggs; three normal and one *runt*; faint bluish-white, marbled and blotched with ecru drab and pale lavender, chiefly on the larger half of shell. Ovate; .99x.73, .97x.74, .98x.73 and *.81*x*.66* inch. *Runt contained no yolk.*

58. **Troglodytes aedon.** HOUSE WREN.—May 18, 1896.

Collected by Isaac E. Hess, Philo, Ill. Two normal and *two runt* eggs; incubation commenced. Surface so thickly covered with minute specks of reddish brown and faint lavender as to almost completely hide the white ground color. Elliptical ovate; .63x.48, .62x.46, *.56*x*.40* and *.51*x*.39* inch.

59. **Auriparus flaviceps.** VERDIN—(PLATE II, No. 59).—April 23, 1894. Collected by Frank B. Armstrong, near Brownsville, Texas, and secured from the E. A. McIlhenny Collection. Five fresh eggs; one being a *tiny runt*, and so far as I am aware is the *smallest runt on record.* Pale nile blue, normally speckled, chiefly on the larger end with vinaceous-cinnamon and heliotrope. Ovate to Elliptical ovate; .62x.44, .62x.44, .62x.44, .60x.44 and *.37*x*.29* inch.

60. **Turdus ustulatus.** RUSSET-BACKED THRUSH.—June 10,1892. Collected by Fred.A.Schneider, College Park,Cal. Three fresh eggs; two of which are *runts*. Light greenish-blue, marked over entire surface with cinnamon-rufous and vinaceous blotches; *.79*x*.63*, .82x.63 and *.79*x*.62* inch.

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III.—ABNORMAL SHAPE.

61. **Cyanocitta cristata.** BLUBJAY—June 12, 1896. Collected by C. L. Haight, Sterling, Kan. Four fresh eggs; olive-buff, normally speckled with olive, wood brown and lavender-gray. *Short ovate, approaching subpyriform*; 1.19x.88, 1.20x.87, 1.15x.87 and 1.18x.88.

62. **Spizella pusilla.** FIELD SPABROW.—May 11, 1894. Collected by J. Warren Jacobs, Greene Co., Pa. Four fresh eggs; pale bluish or greenish-white, marked thickly with dots and specks of cinnamon-rufous, vinaceous and lavender, chiefly on the larger end of the three normal specimens, and on the smaller end of the abnormal one which is *ovate pyriform* in shape; .73x.54, .69x.55, .69x.55 and *.76*x*.54* inch.

63. **Clivicola riparia.** BANK SWALLOW.—May 24, 1895. Collected by J. Warren Jacobs, Greene Co., Pa. Four fresh eggs, one being *abnormally cylindrical ovate with abrupt blunt* ends; .74x.52, .72x.52, .71x.52 and .72x.47 inch.

64. **Icteria virens.** YELLOW-BREASTED CHAT.—May 20, 1894. Collected by J. Warren Jacobs, Greene Co., Pa. Three fresh eggs, one of which is abnormally shaped, being *elongate ovate*; white, normally speckled with brick-red, heliotrope and lavender; .83x.66, .86x.65 and *.95*x*.63* inch.

IV.—ABNORMAL SIZE AND SHAPE.

65. Larus franklinii. FRANKLIN'S GULL.—June 8, 1896. Collected by Edwin S. Bryant, Sweet Water Lake, Ramsey Co., N. Dak. *Abnormally long narrow specimens*, two in number; incubation begun. *Cylindrical ovate*; *2.38*x*1.37* and *2.32*x*1.38* inches.

66. Phalacrocoras dilophus. DOUBLE-CRESTED CORMORANT.—June 18, 1897. Collected by Edwin S. Bryant, Sweet Water Lake, N. Dak. Two slightly incubated eggs; soiled bluish white, almost completely covered with a thick coating of chalky deposit. One appears normally elliptical ovate, *but unusually large*, while the other is a *long narrowly drawn out, cylindrical ovate* specimen; 2.28x1.48 and *2.76*x*1.42* inches.

67. Anas strepera. GADWALL.—June 24, 1897. Collected by Edwin S. Bryant, Island in Devil's Lake, N. Dak. Eight eggs, one of which is an *oval shaped runt*. Creamy-buff; normal specimens are elliptical ovate; 2.08x1.48, 2.00x1 47, 2.11x1.50, 2.08x1.49, 2.07x1.49, 1.92x1.46, 2.03x1.49 and *1.33*x*1.12* inches.

68. Spatula clypeata. SHOVELER.—May 18, 1897. Collected by Edwin S. Bryant, near Grand Harbor, Ramsey Co., N. Dak. Nine fresh eggs, one of which is a *runt—elliptical*. Creamy buff, with a greenish hue, normal specimens are elliptical ovate in shape; 2.11x1.47, 2.11x1.46, 2.04x1.47, 2.07x1.44, 2.10x1.43, 2.03x 1.45, 2 12x1.46, 2.03x1.48 and *1.56*x*1.05* inches.

69. Tantalus loculator. WOOD IBIS. (PLATE III, No. 69). —April 9, 1896. Collected by A. M. Nicholson, Mud Lake, Orange Co., Fla. Five eggs, exhibiting a *wonderful variation in size and shape*. One is a *runt*, oval in shape and measures *1.69*x*1.35* inches; another is ovate in shape, except that the shell *crooks to one side* in its tapering to the small end; the inward kink being on the side where a *narrow band of deep pittings extend half way around the shell*, *2.40*x*1.75*; the third approaches the *fusiform shape, and has a noticeable kink toward one end*, 2.68x1.85 inches; the fourth and fifth are oval in shape and somewhat under average size in long diameter, *2.30*x*1.70* and *2.35*x*1.75* inches.

70. Ardea exilis. LEAST BITTERN.—June 15, 1895. Collected by Julius Wendler, Rice Lake, Goodhue Co., Minn. Two fresh eggs; normally pale bluish-green; one is elliptical oval in shape and normal in size, while the other is a small *spherically shaped runt*. 1.15x.88 and *.77*x*.67* inches.

71. Ardea cærulea. LITTLE BLUE HERON.—April 28, 1895. Collected by E. A. McIlhenny, Avery's Island, La. Six fresh eggs, clear bluish-green (very nearly glaucous-green). Five are of typical size and shape and one is a *runt*, *spherical* in appear-

ance; 1.85x1.30, 1.82x1.30, 1.72x1.30, 1.72x1.29, 1.80x1.29 and *.85*x *.74* inches.

72. Zenaidura macroura. MOURNING DOVE. (PLATE III, No. 72).—May 29, 1896. Collected by J. N. Clark, near Old Saybrook, Conn. Two *addled* eggs, both below average size, one being a small *spherical runt*; 1.10x.85 and *.68*x*.64* inches. Bird flushed from nest. Evidently a second laying, as two young were seen near the spot a few days previous.

73. Circus hudsonicus. MARSH HAWK.—May 30, 1896. Collected by Edwin S Bryant, Benson Co., N. Dak. Five highly incubated eggs, one of which is *subpyriform* in shape and *extremely long*; *1.94*x*1.49*, 1.79x1.43, 1.71x1.44, 1.86x1.43 and 1.79x1.46 inches. Color, normally faint greenish-white.

74. Melanerpes erythrocephalus. RED-HEADED WOODPECKER.—May 15, 1896. Collected by W. J. Wirt, near Gaines, N. Y. Six fresh eggs, one of which is a *spherical runt*. Oval to elliptical ovate; .93x.77, .91x.75, .94x.75, .85x.70, .92x.76 and *.70*x *.62* inch. On a later date, Mr. Wirt took a second set from these birds; all normal eggs.

75. Melanerpes erythrocephalus. RED-HEADED WOODPECKER.—May 22, 1896. Collected by R. T. Anderson, near Aylmer, Ont., Can. Four fresh eggs, three of which are *narrowly long*, running in shape from elongate through *cylindrical ovate and fusiform*; .96x.68, *1.07*x*.70*, *1.06*x*.67* and *1.06*x*.70* inches.

76. Colaptes auratus. FLICKER.—April 24, 1895. Collected by B. H. Sinclair, Ottawa, Kan., and secured from the E. H. Short Collection. Seven fresh eggs; glossy white, elliptical ovate and all above the average in size, one being very much *elongated*; 1.16x.94, 1.15x.91, 1.15x.88,1.17x.91,1.21x.92, 1.19.x91 and *1.41*x*.93* inches. On the shell of the abnormal specimen is a number of *dead-white granulations* and a decided "*hump*" on one side; a large circular patch on the larger end is *dead-white* and indicates a *thin spot in the shell.*

77. Contopus virens. WOOD PEWEE.—June 16, 1897. Collected by J. Warren Jacobs, near Waynesburg, Pa. Three eggs containing small embryos. In shape the eggs graduate from normally ovate to *short rounded ovate, appearing almost perfectly round.* Pale cream, marked with blotches and dots of rich claret and chestnut brown, heliotrope and faint lavender, in form of an irregular wreath around the larger end; .71x.56, *.66*x*.56* and *.63*x*.56* inch.

78. Otocoris alpestris praticola. PRAIRIE HORNED LARK. —March 27, 1887. Collected by W. A. Williard, near Grinnell, Iowa, and secured from the Lynds Jones Collection. Three fresh

eggs; a peculiar set varying greatly in size and shape. *Rounded ovate* in the smaller to elliptical ovate in the larger, which is an *unusually large* specimen; *.71*x*.66*, .80x.64 and *.94*x*.70* inch. The ground color is grayish-white, almost completely covered with broccoli brown, wood brown and faint drab-gray; on the two smaller eggs being of equal distribution in form of pin dots, while on the larger specimen the wood brown predominates and is chiefly in large blotches and spots.

79. *Corvus americanus. American Crow. (Plate III, No. 79).—May 1, 1893. Collected by John C Brown, Carthage, Mo. Two fresh eggs; pale bluish-green with yellowish tinge; the normal specimen has bold blotches of grayish and olive-brown and smaller dots of deeper shades of brown, chiefly at larger end; the abnormal specimen is *spherical* and marked with same colors which are thickest in two clusters, one at each end of the longer axis; 1.56x1.22 and *1.43*x*1.38* inches.

80. Agelaius gubernator. Bicolored Blackbird.—May 12, 1895. Collected by Edmund Heller, Riverside, California. Three normal eggs, incubation advanced, and one *addled* (?) *runt*. One of the normal eggs broken in blowing; the remaining two are pale bluish-green, sparingly marked in form of an irregular wreath around the larger end, with black, liver brown and vinaceous-buff, while the runt has a decided grayish tint, but is normally marked. In shape the normal eggs are ovate and the runt is *short oval or spherical*; 1.05x.76, 1.03x.74 and *.56*x*.49* inches.

81. Pipilo erythrophalmus. Towhee.—June 17, 1894. Collected by J. Warren Jacobs, Greene Co., Pa. Three fresh eggs; all *runts* and *spherical* in appearance; white, heavily marked with specks, points and blotches of vinaceous and pale lavender, chiefly on the larger end; *.76*x*.67*, *.76*x*.65* and *.77*x*.65* inch.

82. Pipilo aberti. Abert's Towhee. (Plate III, No. 82).—May 14, 1896. Collected by Frank Bennett, Maricopa, Co., Ariz. Four fresh eggs, one of which is a *spherically shaped runt*; pale bluish-green, normally marked with lines, dots, scrawls and specks of black, burnt sienna and heliotrope purple, chiefly on the larger end; 1.04x.72, 1.02x.71, 1.03x.72 and *.69*x*.56* inches.

83. Cardinalis cardinalis. Cardinal. (Plate III, No. 83).—May 27, 1888. Collected by J. Warren Jacobs, near Waynesburg, Pa. Two normal specimens and one *small spherically shaped runt—containing no yolk*. White with a grayish tint, marked as follows: No. 1, (in engraving, upper right hand fig-

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* Originally described in "Bulletin No. 5, Wilson Ornithological Chapter of the Agassiz Association. The American Crow, (Corvus americanus) with special reference to its nest and eggs, by Frank L. Burns. 1895." (Page 32.)

ure) has innumerable small specks over all the shell, which is overlaid with a diffusion of bold blotches of chestnut, cinnamon-rufous and lavender, chiefly on the larger end; No. 2, on this one the markings are less bold, the lavender approaches heliotrope purple and the browns become vinaceous-cinnamon; No. 3, mottled all over with same colors as No. 1. Size in the order described; 1.04x.74, 1.06x.74 and *.60*x*.50* inches. The shell of the runt is *unusually thick*.

84. **Cardinalis cardinalis.** CARDINAL. (PLATE III, No. 84).—May 5, 1891. Collected by J. Warren Jacobs, near Waynesburg, Pa. Three slightly incubated eggs, one being a *spherically shaped runt with an unusually thick shell.* It is my firm belief that this and the preceding set is the product of the same female, so precise are the characteristics. No. 1 in this set is precisely like No. 1 of the preceding, except that the chestnut markings are less intense; No. 2 truly represents the color characteristics of No. 3 of the former, and just as truly No. 3 of this represents No. 2 of the same preceding set; .99x.72, .99x.71 and *.75*x*.62* inch.

The locality in which I collected these two sets of Cardinal is a section of pasture land, mostly on a hillside and bordered by a large woods on the higher ground, and margined by a small stream (Smith Creek) in the lowland, and lies three-quarters of a mile south of Waynesburg, and is known locally as "Sayers' Barn Field." For many years it was overgrown with various kinds of bushes and briers, and in some parts rank grass and weeds; but sometime after I took the set on May 27, 1888, which was centrally located in a thorny tree in a little ravine, men were put to work clearing the field, destroying this truly typical home of innumerable pairs of Chats, Towhees, Field, Chipping and Song Sparrows, Cardinals, Catbirds and Indigo Buntings. Fortunately for the birds, the growth along the creek bank was left undisturbed, affording nesting sites for several of the species, conspicuous among which was the Cardinal and Catbird. It was on this sparsely fringed creek bank where the abnormal set was taken in 1891, directly opposite where the little ravine puts through the brush into the creek and less than two hundred yards from the former site.

85. **Cardinalis cardinalis.** CARDINAL.—May 14, 1893. Collected by J. Warren Jocobs, Greene Co., Pa. Three fresh eggs, one of which is *elongate ovate* and two are *cylindrical ovate.* White, normally speckled and blotched with vinaceous-cinnamon, lavender and heliotrope purple, chiefly on larger end; *1.04*x*.68*, *1.07*x*.67* and *1.11*x*.64* inches.

86. **Piranga erythromelas.** SCARLET TANAGER.—May 30,

1897. Collected by J. Warren Jacobs, near Waynesburg, Pa. Two eggs under average size, one being a *runt.* Nile blue, marked chiefly on larger end with specks and blotches of vinaceous-rufous and lavender. In shape, the normal specimen is elliptical ovate, while the runt is *rounded ovate*; *.79*x*.64* and .82x.63 inch. Beneath the nest from which I took this set were scattered the fragments of another egg.

87. Clivicola riparia. BANK SWALLOW.—May 24, 1896. Collected by R. T. Anderson, Aylmer, Ont., Can. Originally four slightly incubated eggs—one accidently broken—of a *short rounded ovate shape and all below normal size*; lusterless white; *.64*x*.53*, *.64*x*.52* and *.66*x*.52* inch.

88. Helmitherus vermivorus. WORM-EATING WARBLER.—May 24, 1893. Collected by J. Warren Jacobs, near Waynesburg, Pa. Four fresh eggs; white, with creamy tint, marked with pale lavender and pinkish vinaceous, former predominating. On two they are minute dottings, chiefly on the larger end; on the third, blotches are bolder; fourth is a *peculiarly long cylindrical ovate* specimen, with markings numerous over entire shell, thickest, however, in form of a wreath around smaller end; .66x .52, .68x.51, .72x.55 and *.80*x*.52* inch.

89. Sylvania mitrata. HOODED WARBLER.—June 4, 1894. Collected by Thos. A. Smithwick, Merry Hill, Bertie Co., N. C. Two eggs containing medium embryos; white, with faint creamy tint; one is a *true ellipse* in form, marked with reddish brown, heliotrope purple and lavender, almost wholly in the form of a beautiful wreath around one end; a very curious shaped egg is the other one of this set, *pyriform with an extension of the smaller end, having a sudden outward curve then terminating in a sharp point.* Its coloration is similar to its companion, the wreath being around the greater end; .70x.54 and *.78*x*.53* inches.

90. Setophaga ruticilla. AMERICAN REDSTART.—May 23, 1897. Collected by Clarence F. Stone, Potter Swamp, near Branchport, N. Y. Four fresh eggs, exhibiting a *spherical or rounded appearance*; one end, however, being slightly pointed; white, with a creamy buff tint, heavily marked with lavender-gray, chestnut and vinaceous-cinnamon, chiefly on the larger end, where on two there is a tendency to cluster in band or wreath; *.60*x*.51*, *.59*x*.51*, *.58*x*.50* and *.56*x*.49* inch.

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V.—ABNORMAL SIZE AND COLORATION.

91. Nycticorax nycticorax. BLACK-CROWNED NIGHT HERON.—May 31, 1896. Collected by Edwin S. Bryant, Sweet

Water Lake, N. Dak. One normal specimen measuring 1.98x 1.49 inches, and two *abnormally small* ones measuring *1.75*x*1.33* and *1.65*.x*1.27* inches. These runts are also *abnormal in color, being glaucous green and of a tint much deeper than typical color of most herons' eggs.* The shell is also peculiar, being *thin and brittle and covered with hundreds of sharp*, *bur-like granulations*, chiefly in a band around the middle. Incubation commenced in the normal egg.

92. **Callipepla gambeli.** GAMBEL'S PARTRIDGE.—April 16, 1896. Collected by O. W. Howard, Catilina Mts., Ariz. Nine fresh eggs, exhibiting great variation in size, and showing four distinct types of markings. Nos. 1 and 2, numerous fine dottings and bold blotches of chestnut and milky brown, distributed over the entire surface, with, however, the majority of the bolder blotches on or near the smaller end; Nos. 3, 4 and 5, markings less numerous and seated chiefly on larger half—bold blotches lacking; Nos. 6, 7 and 8, bold blotches most numerous, scattered at random over shell of two, and mostly on smaller end of the other; in addition to the bold blotches there are numerous fine dottings distributed thinly and evenly over entire shell, 1.24x.96, 1.31x.98, 1.24x.91, 1.24x.95, 1.23x.96, 1.15x.89, 1.14x.90 and 1.20x.94. No. 9, *runt*; elliptical ovate, ground color evidently dull white, *completely covered*—save a few places on smaller end where color pigment has scaled off—*with fine points of chestnut and olivaceous brown and grayish, blending from the darker shade* on the smaller to the lighter on the larger end; *.65*x*.51* inch. The eight normal specimens are short ovate in shape, pale clayish-white with a decided buffy tint in Nos. 6, 7 and 8.

93. **Pinicola enucleator.** PINE GROSBEAK. (PLATE IV, No. 93).—July 17, 1896. Collected by O. W. Knight, Bangor, Maine. Three fresh eggs, laid by a captive bird, *varying in size and coloration.* Ovate to elliptical ovate in shape, and, on the whole, resemble eggs of the Chipping Sparrow on a large scale. *Light to deep glaucous-green*; one marked with black and fawn color in form of a small irregular wreath around the larger end; on another the markings are confluent in a large circular patch on the larger end, and the black of the former is here broccoli brown; on the third raw umber flakes are noticeable in addition to the other colors and all are seated chiefly in a broad wreath around the larger end; *.93*x*.64*, *.87*x*.63* and *.83*x*.59* inch.

94. **Melospiza fasciata.** SONG SPARROW. (PLATE IV, No. 94).—May 28, 1897. Collected by W. J. Wirt, Gaines, N. Y. Five fresh eggs, four of which are normal and one a *runt*. In coloration this runt is abnormal inasmuch as the markings of chestnut and heliotrope purple are *clustered in dense wreaths about eith-*

er end—brown predominating on the smaller and heliotrope on the larger end; *.65*x*.52*, .81x.62, .79x.62, .81x.63 and .82x.62 inch.

95. **Melospiza fasciata.** SONG SPARROW. June 10, 1883. Collected by Edwin S. Bryant, near Springville, Erie Co. N. Y. Five fresh eggs; four are normally blotched with chestnut and heliotrope purple, thickest on larger end; the fifth is a *runt abnormally colored*, very closely resembling the *chocolate colored* eggs of the Long-billed Marsh Wren (*Cistothorus palustris*). Elliptical ovate; .78x.62, .80x.62, .78x.59, .78x.61 and *.57*x*.43* inch.

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VI.—ABNORMAL SHAPE AND COLORATION.

96. **Larus argentatus smithsonianus.** AMERICAN HERRING GULL.—June 10, 1894. Collected by Ed VanWinkle, Green Bay, Mich., and secured from the E. H. Short Collection. Three eggs, one of which is *elliptical oval and possesses a clear greenish band around one end.* Olive buff, marked with brown of varying shades, over a diffusion of drab-gray; 2.92x2.01, 2.99x1.98 and *2.99*x*1.98* inches.

97. **Molothrus ater.** COWBIRD. (PLATE IV, No. 97,) with a set of Red-eyed Vireo (*Vireo olivaceus*).—June 10, 1896. Collected by W. F. Hill, Lake City, Minn. This peculiar specimen is well represented in the engraving. The egg is *pure white*, and save for a number of faint blotches of subdued lavender, scattered at random over the surface, *very much resembles the Vireo's eggs*, but larger—the black and dark markings being of the same *delicate pigment seen on Vireo's, softening under the application of water*; .92x.70 inch. Size of Vireos'; .79x.58, .80x57, .83x.61 and .82x.60 inch.

98. **Molothrus ater.** COWBIRD. (PLATE IV, NO. 98), with a set of four fresh eggs of American Redstart (*Setophaga ruticilla*).—May 30, 1896. Collected by W. F. Hill, Lake City, Minn. This egg is *like the Redstart's in every particular except size and ground color*; in the latter respects being entirely different from any specimens of Cowbird's eggs I have ever seen, being an *olive-buff with a warm, creamy tint*, marked with specks and blotches *of cinnamon and heliotrope purple in a broad band around the larger end—just like the encircling wreaths on the accompanying Redstart specimens*, the colors of the latter, however, being more brilliant and seated on a clear creamy-white ground. Size, Cowbird's egg, .88x.70 inch; Redstart, .67x.48, .62x.48, .62x.49 and .62x.49 inch.

99. **Petrochelidon lunifrons.** CLIFF SWALLOW. (PLATE IV, No. 99).—May 27, 1885. Collected by Arthur C. Chapman, Oak Orchard, Orleans Co., N. Y., and secured from the Neil Franklin Posson Collection, Medina, N. Y. Four fresh eggs,

having a *prolate spheriod shape*; pure white—one with a *slight yellowisa tinge. Only two are marked and these only faintly so, one having two large palmate leaf shaped spots* (suggesting common maple leaf) *of faint yellowish brown, and the other, half-dozen very small specks of faint purplish brown about one end*; .74x.60, .73x.60, .75x.65 and .71x.61 inch.

100. **Ampelis cedrorum.** CEDAR WAXWING. (PLATE IV, No. 100).—July 21, 1893. Collected by B. S. Bowdish, Phelps, N. Y. Four fresh eggs; *rounded ovate,* light bluish-stone, much lighter than usual with the species and *unmarked, except that one has one and another has two very small indistinct shell markings of bluish-stone* near the larger ends; .82x.68, .81x.68, .87x.68 and .84x.68 inch.

101. **Icteria virens.** YELLOW-BREASTED CHAT.—May 26, 1894. Collected by J. Warren Jacobs, near Waynesburg, Pa. Four slightly incubated eggs; white, *sparingly and finely dotted* with lavender and vinaceous-rufous,noticeably thickest on larger end. In shape these eggs vary greatly, two being ovate, one *elongate ovate* and one departing from the elliptical ovate in a *prominent kink to one side*; .89x.66, .87x.64, .96x.64 and .87x.64 inch.

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VII.—ABNORMAL SIZE, SHAPE AND COLORATION.

102. **Larus occidentalis.** WESTERN GULL.—June 17, 1895. Collected by Chester Barlow, Farallone Island, Pacific Ocean. One fresh egg, *elliptical. Olivaceous brown*, marked, chiefly on one end, with blotches and blurs of black, dark brown and drab, in general appearance *very much resembling an egg of the Loon (Urinator imber) in miniature*; *2.65*x*1.52* inches.

The average size of a set of three eggs of this species, in my collection, is 2.87x1.96 inches.

103. **Melospiza fasciata.** SONG SPARROW. (PLATE IV, No. 103).—July 30, 1896. Collected by Wm. L. Kells, Listowell, Ont., Can. Three fresh eggs; nest evidently deserted. Abnormalism in the three essential points set forth in the heading for this group is strongly characteristic of this set; one is a *small spherical runt, mottled olivaceous* in color and measures *.46*x*.39* inch. It contained no yolk. The second is a *double yolked, extremely long egg* for this species, *fusiform, or more nearly double ovate pyriform in shape*, marked with vandyke brown, heliotrope purple and vinaceous over the entire shell, becoming confluent in small circular patch on one end; *1.08*x*.54* inch. The third is normally ovate, marked thickly over a pale bluish-ground with same colors as the second, becoming confluent on larger end; .79x.58 inch.

104. **Melospiza fasciata.** SONG SPARROW.—June 14, 1887. Collected by Frank L. Burns, Berwyn, Pa. One *infertile* egg, taken from a nest containing three half grown young birds. *Solid white*, spairingly blotched with faint lavender, cinnamon-rufous and vinaceous; *rounded ovate or more nearly spherical*; *.50*x*.42 inch.*

105. **Ampelis cedrorum.** CEDAR WAXWING.—July 19, 1891. Collected by J. Warren Jacobs, Greene Co., Pa. Three

eggs, *sterile*; pale stone or *more nearly soild white—almost immaculate*—markings of faint grayish brown, chiefly on larger end. These eggs are of a *peculiar ovate pyriform shape, with long drawn out small ends and compressed in the middle, and on the whole, suggest necked gourds*; .90x.59, .99x.61 and .96x.51 inch.

106. Lanius ludovicianus. CALIFORNIA SHRIKE.—May 13, 1892. Collected by Ralph Arnold, San Fernando, California. Two *small spherically-shaped runts*; olive buff, *almost completely covered* with a mottling of raw sienna, broccoli brown and lavender gray; *.58*x*.50* and *.50*x*.39* inch.

107. Dendroica æstiva. YELLOW WARBLER.—June 26, 1884. Collected by Lynds Jones, Jasper Co., Iowa. Four *runts*. When studied in connection with a large series of eggs of this species, showing considerable variation, this set is surprisingly different, being scarcely more than *half the average size*. Notwithstanding this fact, incubation had started, but from some unknown cause, the nest was deserted and the eggs were becoming *addled*. Their color is a dull white or leaden hue—resembling in this respect one normal set in the series. The markings throughout are *minute dots* of slate, russet and lavender-gray (latter predominating), seated chiefly on larger ends of three, and on the smaller end of the fourth; *.56*x*.41*, *.56*x*.41*, *.59*x*.39* and *.62*x*.39* inch. Two are elliptical ovate, one *cylindrical ovate* and one *ovate oblong*.

108. Setophaga ruticilla. AMERICAN REDSTART.—May 26, 1895. Collected by Ernest Marceau, East Dubuque, Illinois. Four *small* eggs, advanced incubation. An *indiscribable short fusiform shape*, departing from trueness in many ways, a noticeble feature being their *strangely kinked ends, twisting in opposite directions*. Creamy white, all marked with blotches of heliotrope-purple and raw sienna (former predominating), seated chiefly on *one side of the shell—on two being wholly so*. Markings are comparatively few in number; *.60*x*.48*, *.59*x*.51*, *.59*x*.52* and *.61*x*.51* inch.

109. Merula migratoria. AMERICAN ROBIN. (PLATE IV, No. 109).—June 1, 1893. Collected by Mark L. C. Wilde, Cape May county, N. J. Four fresh eggs; in size, shape and color, three are normal and one is a *runt, spherical in appearance, and of deep greenish-blue color, resembling the hue seen in the eggs of the Catbird* (*G. carolinensis*), 1.05x.78, 1.08x.78, 1.07x.78 and *.64*x*.55* inches.

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VIII.—ABNORMAL SHELL TEXTURE.

110. Icteria virens. YELLOW-BREASTED CHAT.—May 24, 1897. Collected by J. Warren Jacobs, near Waynesburg, Pa. Four slightly incubated eggs, having a *thin frail shell, covered with a superfluous deposit of same material distributed in large warty patches and sharp granulations*, and being of sufficient quantity throughout the entire set to form two nearly perfect shells of this species. However, when we take into consideration the frail, imperfect structure of the shell proper, it seems reasonable to suppose that all this extra material might have been used in perfecting its formation. Elliptical ovate; white, marked with heliotrope-purple, lavender and claret brown of equal predominance, and seated chiefly on the larger end, where on one they run together in form of a wreath; .92x.69, .94x.69, .92x.69 and .94x.69 inch.

THE Story of a Martin Colony

GLEANINGS

No. II.

THE STORY OF A MARTIN COLONY.

ILLUSTRATED.

*Observations on a Colony
of Purple Martins.
(Progne Subis.)*

By J. WARREN JACOBS.

*Waynesburg, Pa.,
Independent Book and Job Office.
1903.*

GLEANINGS.

—A series of pamphlets based chiefly on the Author's research in ornithology and oology and published from time to time as accumulating material and data permit.

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INTRODUCTION.

Before the advent of the English Sparrow in this community, the Purple Martin found numerous friends and admirers among the people, who encouraged it by erecting beautiful bird-houses for its accommodation. It had a winged foe, at that time, in the Bluebird, who fought it from its home; but the interruption was only trivial when compared with the havoc wrought by the sparrow, when it became numerous.

Every bird-house in town eventually became crowded with sparrows and instead of the twitter of the industrious martins, bubbling over with happiness, the monotonous jingle of the sparrows became the rule, changing the charm of the martin houses into rasping "chatter-boxes." The sparrows had their day, however, and people who had either encouraged them or treated them with indifference, began a crusade against them by killing them and tearing out their nests. Persons who had martin-houses fostered the return of the martins until now the birds are increasing.

The writer has always desired a colony of these birds, but, fearing the usual trouble with the sparrows, refrained, for a long time, from putting up a bird-house for their accommodation. The desire to have the martins, coupled with a determination to oust the sparrows, which nested about our buildings, prompted me to erect a martin-house in 1896 and establish a colony which has grown to large proportions, necessitating additional houses until now the birds have ninety-nine nesting rooms at their disposal, about three-fourths of which were occupied in 1902. Nor has this been the limit of the good results of establishing the colony seven years ago. Many more birds are reared at my houses, annually, than get nesting rooms the next spring when they return; thus creating a surplus of birds which find homes in the numerous new houses I have built for bird lovers in various parts of town. Five of these I erected in the spring of 1902, and all were occupied by several pair of birds,—a half dozen pairs nesting in each of the two houses I erected in the very centre of town.

A carefully kept record of observations on the birds and their habits since the colony was established, was found to be invaluable in the preparation of this paper.

J. WARREN JACOBS.

Waynesburg, Pa.
Jan. 1, 1903.

Topographical Sketch and Existing Conditions of the Premises and Vicinity.

As the writer sits at his desk and looks out upon the busy, bustling scenes of today, he stops to ponder over the great changes which have taken place since we came here from the country, twenty-six years ago. At that time nearly all the surrounding property was vacant land. Immediately west was a large bottom-land pasture field where I spent many happy boyhood days, playing Indian and building wigwams of the growing iron-weeds. This field is now occupied by the yards, depots, shops and storage buildings of the Waynesburg and Washington railroad. South of these grounds is Tenmile creek, a beautiful stream, a hundred and twenty-five feet wide, the banks of which were once lined with giant elms, sycamores and maples, forming a beautiful canopy, but now replaced by a row of dingy ice-houses. One hundred feet east of our place is Morgan street, and east of this street and extending back to the creek, are the grounds of the Waynesburg Fair Association, now being laid out for buildng lots. Opposite these grounds, on the south side of the creek, between Luse's Hill and Duvall's Hill, lies Smith creek, a tributary of Tenmile, coming in from the south. Much of this section was covered with timber, which has almost entirely disappeared, being replaced on the sloping side of Luce's Hill and in the valley with numerous dwellings and some steam works. Duvall's Hill at some points is almost perpendicular, barely permitting footing for the trees. Some of the old trees are still standing, but the greater part of the face of the bluff has been changed by workmen quarrying stone.

North of our place the ground rises gently toward the central part of town, and much of this, twenty years ago, was farmed. Now all the streets are opened and the section is built up closely with residences and business buildings.

On our premises we have two business buildings on the north-east corner, fronting on First street, and one on the south-west corner, fronting on Washington street. Our residence is on the north-west corner of the plot, fronting on Frist and Washington streets, and surrounded by a lawn dotted with roses, shrubs and evergreen trees. Back of the lawn is a garden spot, two vine arbors and a number of fruit trees. Along the curb on both Washington and First streets we have rows of maple shade trees.

Although surrounded on three sides by properties affording little or no encouragement to birds, other than English Sparrows, our premises have always been a favorite spot for many species. We have nesting annually in our own trees or along the creek bank adjacent, Robin, Cardinal, Catbird, Carolina Wren, Chipping Sparrow, Song Sparrow. Yellow Warbler, Warbling Vireo, Mourning Dove, Kingbird, Flicker, Baltimore Oriole and Red-headed Woodpecker. Other species which I have known to nest occasionally are Americon Goldfinch, Crested Flycatcher, Downy Woodpecker, Orchard Oriole, Cedar Waxwing, Bronzed Crackle, Bewick's Wren, Barn and Cliff Swallows, Pheobe, Wood Pewee, Bluebird (regularly from 1886 to 1890) and Black-capped Chickadee, (1901, brood of four reared in a post of our grape arbor.) About twenty-five other species, such as Tufted Tit, Bank Swallow, Screech Owl, Cuckoos, Sparrow Hawk, Kingfisher, Woodcock, Towhee, Sandpiper, etc., have been observed on and about the place.

The presence of so many species is due, perhaps, to the country lying to the southward, being open pasture and waste land, affording an easy retreat and fine feeding ground. It is over this ground and along the creek where my martins spend most of their time foraging for food.

Establishment and Subsequent Increase of the Colony.

In the spring of 1896, when I constructed the first of the three bird-houses which harbor my present colony of Purple Martins (Progne subis), I anticipated a larger number of occupants than actually took possession. For a week after I erected the twenty roomed handsomely painted miniature residence on a ten-foot pole, about sixty feet from our house, not a single bird alighted upon it; and only once or twice did a bird come down to inspect the outside. This baffled me considerably, for I expected, from the proximity of a small colony,—a hundred yards to the north,—a few birds to take up quarters immediately. But they did not, and I finally concluded that the box was not high enough off the ground. I therefore lowered it and added three feet to the length of the pole, making the height thirteen feet above the ground. A day or two afterward a fine old purple male came and spent several hours in specting the entire box, and showed by his actions that the quarters were to his liking. The next morning a female put in an appearance and the entire box was again inspected. Nearly all that day the female remained quietly in the various rooms, or on the roof, while the male kept up a continuous chatter with his head turned upward, scanning the cloudless sky for his relatives, which he could discover with surprising quickness. When he caught sight of another martin 'though high in the air, he would launch out from the box and hasten to overtake him, and after soaring around for a moment, begin a descent to the box, chirping loudly, and endeavoring to induce the newcomer to come down to his new residence; but almost without exception his efforts were in vain.

It was near May fifth before the single pair of birds began building their nest, and up to this time, the other martins, soaring about paid but little attention to my new box, rarely stopping on the wing to inspect it. This poor beginning, however, was to have a better ending, for about one week after my happy couple had their nest ready for the eggs, I was greeted one morning about five o'clock by an unusual twitter and chatter at my bird-house, and on going out I was delighted to count eight new birds,—the males all being birds of the previous year. All day long, the birds staid close to the box and continued their twitterings and seemed to be on the most friendly terms with the first pair.

Not many days had elapsed before the new-comers were engaged in nest building. Two pairs were repeatedly disturbed by English Sparrows and one of these went elsewhere to nest. The other pair tried a third time, but only one of the eggs hatched, and this young did not leave its nest until August 29th., although the bulk of the birds of this town left for the South on the 17th. The number of young brought to maturity was eleven, and I now considered my martin colony an assured fact.

March 21st., the next year (1897) the first martins put in an appearance. Six were observed, one of which—an adult male—was at my house. April 11th. found the birds omparatively common. Ten pair took up quarters in my box, and on June 7th., when I went up to count the eggs, nearly all the females were sitting, though one belated pair had their nest only ready for the eggs. Thirty-five young were successfully brought out.

The number of nesting birds having doubled in two years prompted me to prepare more room for their reception the next spring. So I presume the birds were agreeably surprised upon their return in 1898 to find a new and elegant thirty-four roomed house awaiting them. Nor was this new house superfluous for the number of nesting pairs, taking up quarters, in it was fourteen; two more than accupied the old box, during this, its third season. Thirteen of the males, taking up quarters in the new box, were young of the previous year, which leads me to believe that all were from my first house.

On June 6th., when I counted the eggs, there were ninety-seven in the two boxes; but two nests were incomplete as well as three or four sets, so this number is short, a score or more, of the season's aggregate. Eight birds met death in various ways, two of which were nesting males, which, perhaps, puts the number brought to maturity to between ninety and one hundred. This new house, I erected sixteen feet high, eighty-five feet west of th old box and about forty feet from our residence.

The wonderful increase of my colony in three years, prompted me to provide still further quarters for the birds in 1899; and accordingly when the birds came that year I had ready for them the third and last house put up for their accommodatoin; and as had proved true when I put up the second house, the extra room was needed, for the number of pairs in the colony was fifty-three, sixteen in each of the two old boxes, and twenty-one in the new. The census this year was taken on June 14th., after the young had commenced to hatch. Sixty-three callow young were counted and one hundred and fifteen eggs. Most of the latter were well along in incubation, though an occasional fresh set and two or three incomplete sets were observed. The number of young brought to maturity was over one hundred and fifty and probably less than one hundred and seventy-five. The location of the new box is sixty feet north of No. 1, forty feet from our house and about one hundred feet from No. 2 bird-house. The colony now appeared to be enormous—nearly three hundred birds at the close of the fourth season was more than I expected to secure when I put up the first house in 1896. They could not all get lodging in the ninety-nine rooms when they came home in the evenings, so more than a hundred roosted in the apple tree nearest the old box.

A serious question now confronted me as to the future development of the colony, should it attain such proportions as to menace the cleanliness of the lawn. Indeed, it became apparent that annoyance of this kind would arise if I continued to supply room for the annual accumulation of birds. I therefore decided to let the matter rest and erect no more new houses for a few years at least.

Sixty rooms were occupied in 1900, and after the young had hatched, I counted two hundred young heads protruding from the various nesting rooms.

There were many more birds came to my boxes this year, than got accommodations. More could have got nesting rooms but some pairs seemed to keep more than one room, and in this way many were deprived of room to nest.

The birds thus failing to secure rooms gather themselves into a compact flock some evening, and after a great commotion about the boxes, depart to other quarters or emigrate to some of the newly erected bird houses about town. The fact that the birds leave in a compact body and that they know just where they are going impresses itself more and more each year. It might be of interest to observe in this connection that the birds, taking up quarters in the new houses which I have erected for other parties, take possession during the night or very early morning, and all seem to belong to one flock, and are most all birds of the previous year.

After most all the young birds were strong enough to soar away with their parents during the day, and again return at evening, much fighting and squabbling was indulged in over the possession of rooms, and finally more than a hundred packed the apple tree which had been used the previous year.

In 1901, sixty-seven pairs nested; and the number of young heads counted two hundred and twenty-five. Of this number at least twenty-five were killed by excessive heat, leaving a total of about two hundred reared this year.

On May 28, 1902, I took the seventh annual census of the colony with the following results: Rooms occupied, 72; containing eggs, 50; containing both eggs and young, 2; nests undergoing construction, 20; total number of eggs and young on this date, 245. After this date I ascended to the boxes only to replace young which had fallen out; so the exact number of eggs laid in the remaining twenty nests was not ascertained, but I feel safe in stating that as least three hundred eggs hatched. Of this number one half died of starvation about the time they were ready to leave their nests.

Taking the first four years as a basis, and deducting one-fourth in each of the three succeeding years, for probable loss, the colony should have contained over twelve hundred birds at the close of 1902, had I continued to put up new accommodations for them.

Plate I.—Coming Home at Eventide.

Houses Nos. 2 and 3; from photos taken by the Author about 8 o'clock P. M. on July 9 and 18, 1900 respectively.—

The sun had sunk over the western horizon, but still lit up the half cloudy heavens with a rich golden and snow-white splendor.

Return from the South.

The weather affects their return very much, but generally by April 5th. several individuals can be seen. The first arrivals usually come singly, are males in adult plumage, and stay only a few hours, then disappear as quickly as they came. This is nearly always the case when they put in an appearance before March 28th., but when March weather continues blustering and keeps the birds away until April, they come in small bands, and later in large numbers. Sometimes we have disagreeable weather in April after the birds become comparatively common, but unless freezing temperature is experienced, they do not appear to be affected, and not a few times have I seen an old male bird thrust his head out of his door, surrounded by little heaps of snow on the porch, and twitter in seeming contentment.

In the spring of 1900 we had a period of frosty nights late in April after a number of brds had arrived, and one morning while the air was yet keen, I noticed the absence of my birds and investigated the cause which I found to be a "pack" of the birds into a central room of house No. 2. One of the birds had become wedged crosswise the door and was dead. After removing this one I liberated sixteen live birds. They were packed in a room six by six by seven inches. At other times I have observed numbers of the birds entering a single room on clear, cold evenings.

Following are my observations on the arrival of the Martins at Waynesburg for twelve years:

1891—First seen April 8, four birds; common April 17.

1892—First seen March 31, one bird.

1893—No record.

1894—First seen April 2, two birds.

1895—First seen March 30, four birds.

1896—First seen March 28.

1897—First seen March 21, six birds at the various bird houses in and near Waynesburg. One adult male remained at my box most of forenoon. For a week afterward the weather was cold and no birds were seen. April 11th., they were common.

1898—Backward spring kept the birds away until April 9th., when I noticed two, but the next day they suddenly became common.

1899—March 23rd. one bird seen—a male of previous year.—March 24th. an adult male, and on 26th., three adult males, one female and one young male. April 5th. they were numerous.

1900—March 26th., favorable weather for a week brought a score of Martins to my boxes today. Heavy snow storm on 28th., lasting all day, did not affect the birds. Temperature above freezing, snow slushy and soon melted. From the fifth of April to eighteenth, days warm, nights cold; birds collected in one room of House No. 2, at dusk.

1901—March 20th., 21st., 22d., two adult males observed, 24th., "cold snap" drives them back. April 6th, they were common.

1902—March 22. One adult male appeared at my place in the evening which was the first noted by me this year; but only a few individuals were observed for several days after this date.

Seldom do the birds of the previous year arrive with the bulk of adults, but usually a week or ten days later, though, as I have already noted, a young male occasionally gets in with the early arrivals.

Those early individuals make their presence known from 10 o'clock A. M. to evening; but later where large numbers arrive, they are generally first observed at dawn, and probably came during the night.

Nest Building, Deposition and Number of Eggs.—Incubation.

Nest building covers a period of several days, the male assisting, though he often gets in the wrong room. They collect twigs, straws, bits of wood and grass from the garden and street, and along the creek, not going far from the premises. In nearly every instance a small wall of mud is built around the front of the nest, just inside the entrance. Generally by May 5th. some nests are ready for the reception of the eggs, though the bulk are not ready for some days later; especially those of the young of the previous year, who are a few days behind their parents in this respect as in their return from the South.

The nest varies in depth, some being deep cup-shaped structures, while others are very shallow; and, in a few instances, only a scanty supply of twigs and grass were spread upon the floor for the eggs. In one room the eggs had been deposited on the bare floor without a single piece of nest material to prevent them from rolling about.

The eggs are deposited in a close cluster in the center of the nest, and, after the set is complete, are partly covered with bits of apple leaves which they pluck from the tops of the apple trees, or with the seed pods of the locust tree which they find on the creek bank.

From three to six and rarely seven eggs are laid, the prevailing number varying in different years. In 1896 when one pair were adults and the rest immature birds, the number of eggs to the set was three and four; the adults laying four, and the young birds having one set of four and two of three. The pair driven away by the sparrows also deposited four eggs.

In 1897 the largest set was of five eggs; two of the ten sets containing this number. The adult birds, of which there were five pairs, had sets of three and four eggs.

In 1898 nine sets contained five and two six each, and the rest three and four eggs each. Several of these, however, were fresh and probably incomplete.

In 1899 the prevailing number was four followed closely by five, four sets were of six and probably about the same number of three each.

On May 22, 1900, when I took the annual census, a large number of sets were incomplete, but the numbers held out about as they did in the previous year,—four eggs predominating, followed by five and then six.

In 1901, the predominating number was five; several sets contained six, and only a few with less than five,—many of these were doubtless incomplete on the date of the count, May 24th.

The numbers held out in 1902 about as they did in the previous year, but at the time of my count many sets were incomplete. Those known to be complete were twenty sets of five eggs; eleven sets of six and seven sets of four eggs each, and in one nest the unusual number of seven eggs were found.

My records show a total of about eleven hundred and fifty eggs laid during the seven years; and the number of young reaching maturity eight hundred and fifty.

Incubation lasts from twelve to fifteen days, the female, I believe, attending to this duty exclusively. The male is often in the room while the female is sitting, but I do not think for assisting in incubating the eggs. The earliest date I have for eggs to hatch is May 29th., in nests started on the 26th. of April. Throughout the month of June, and sometimes in July, the parent birds can be seen carrying out the fragments of shells, freshly discarded by the young.

The height of the hatching period is from the 10th. to the 15th. of June.

The Growing Young and the Parents' Care.

The young, when they first leave the egg-shells, are repulsive looking objects with large heads, eyes closed, and small shiny bodies, without down. The skin is thin and transparent. While yet quite small their eyes open, but in the from of a small crevice only.

During the first day they are not fed by the parents, the mother covering them most of the time. On about the fourth day down begins to appear on the crown and down the back, on each side of the middle; and when a week old numerous pin feathers of the wings and tail appear.

After the fifth day the birds grow very rapidly and are

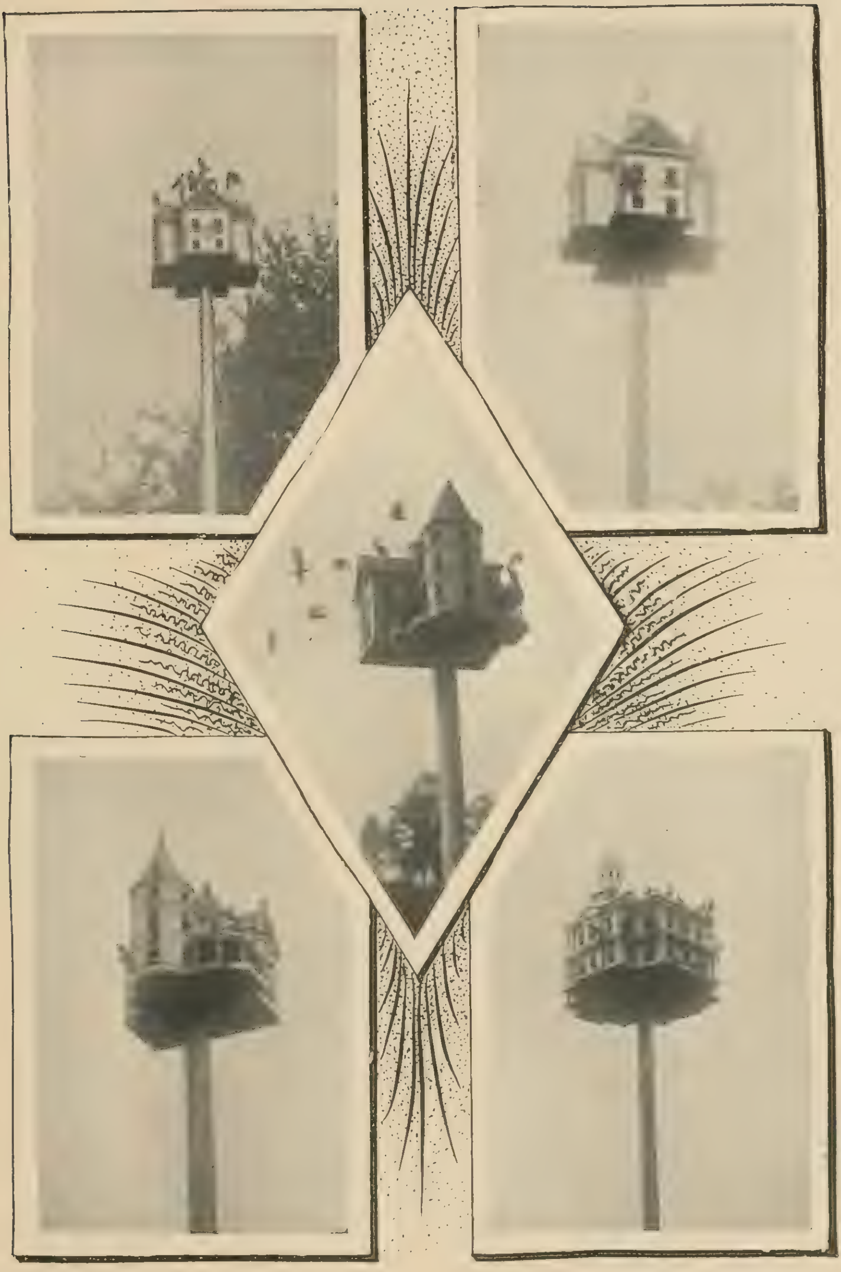
Plate II.

Houses Nos. 1, 2 and 3; from photos taken by the Author during July 1900.

The two upper pictures taken while the birds were collecting on house.

Central picture from snap shot as the birds took flight and scurried from the house.

The fourth and fifth pictures taken while a number of birds were at rest on the houses.



clamorous for food, their incessant chirping being audible to the opposite side of the street. At the end of eghteen days the young are pretty well feathered, and somewhat resemble the mother birds. They gather at the door of their room and crane their necks, scanning the surroundings or watching for the return of the parent birds with food. Sometimes five or six young birds will have their heads thrust out of the door to their room at the same time, but more often only the tips of their beaks protrude.

From twenty-four to twenty-eight days elapse from the time the young break the shells until they are strong enough to leave the nest and safely soar away wth their parents during the day. Occasionally a venturesome youngster, yet too weak to make much use of its wings, will attempt to fly, but become stranded a few rods away from the box. Not a few times have I seen a bird leave its house and laboriously wing its way a few yards, all the time coming nearer the ground, but suddenly, as if by a new impulse, rise slowly and then gracefully soar away with its parents.

While the young are quite small the parents usually take turns gong for food,—as soon as one comes in the other goes out,—but later both are kept quite busy, from early morning until late evening, ministering to their wants. Sometimes the outgoing and incoming birds are so plenty that they remind one of working bees about a hive.

By far the greater number of old birds forage over Duvall's Hill and the ridge fields to the southward; and, returning, these birds soar to a point nearly over our place, then with one grand sweep, drop direct to their respective houses and quickly enter their nesting rooms. In leaving the nest they carry away the droppings of the young, which they generally drop from one hundred and two hundred feet from the box.

When I find a young bird upon the ground, I ascend a ladder and try to put it in its nest, but this is usually difficult as so many nests contain young about the same age. However, I do not have to wait long for a second trial, if my selection is wrong for the intruder is soon hurled from the room. Young which can fly a short distance, I place in the tops of the apple trees, or on one of the bird houses, but the old birds do not seem to give them food, and only approach them in an endeavor to make them fly. About two-thirds of those which leave the nest prematurely are killed in the fall, or die of starvation or neglect.

The parents get very audacious and dart down at the head of a person they are not accustomed to see on the lawn; and will sometimes fly at drivers passing along the street.

When a young brood is old enough to leave the nest, several old birds will fly back and forth in front of the door and keep up a continuous chatter, endeavoring to induce the young to come out; and as soon as one does launch itself into the air, the old birds gather round and fly at it, seemingly to force it to an effort to escape them. In this manner most of the young are taken safely away over the hill to the southward.

For a week or ten days, the brood is brought back to its home each night.

Something About Their Food.

The Purple Martin, as is well known, is eminently an insectivorous bird, catching its prey while on the wing, its food, therefore, consisting of winged insects, such as butterflies, beetles, cicadae, dragon-flies, may-flies and winged ants. By carefully watching the old birds feeding their young one would suppose that they feed principally on dragon-flies and butterflies with an occasional grasshopper and annual cicada, as these insects are large and easily recognized, but upon a thorough examination of the nesting rooms, after the birds have gone, remains of myriads of small black beetles that infest the air during the evening hours after four o'clock, throughout the summer months, are found. It is interesting to watch the parent birds searching the air for these minute insects, moving back and forth, rising, falling, wheeling and darting.

One evening while walking along the railroad track, a short distance west from my home, I observed fifty or more martins, soaring around, only a few feet above the ground, and capturing small winged insects resembling ants, which were emerging from the ground, railroad ties, old timbers and almost every conceivable nook, and immediately taking flight. Dragon-flies form a larger per cent of their food than do butterflies; grasshoppers, which form a small part of their food are brought in from the hill-top fields to the southward. The annual cicadae or locusts are brought in in small numbers; but in 1897, when the seventeen-year variety made their appearance, the birds appeared to thrive almost wholly on them, an immense number being brought to the young. On one occasion I timed the old birds feeding the young, and during a period of only fifteen minutes, twenty-one locusts were fed to the ten broods then in the house. Any of these large insects are swallowed immediately by the half grown young and the older birds.

A large number of insects are dropped to the ground, beneath the boxes, but the old birds will not venture down for them. During the early period of the colony, when it contained only a few pairs, I frequently induced the old birds to reclaim some of their prey, thus lost, by tossing the larger insects up toward the box, when the old birds would swoop down and catch them in their beaks. The booty that drops to the ground does not go to waste, for I have a pair of Catbirds which spend half their time on the ground, beneath the boxes, feeding at the martin's expense. A pair of Cardinals and several Robins also make visits to the larder.

Some of the old martins have been seen to eat small bits of apple leaves, while resting on the tips of the branches. Just a few times I have noticed some of my birds waddling about on the ground in the garden and apparently feeding, but whether on seeds or insects could not be ascertained, but as they seemed to prefer ground freshly worked, which exposed many insects, leads me to believe they were in quest of these.

Along the creek, martins can be seen at all hours of the day, skimming over the surface, frequently dipping their beaks into the water.

Their Enemies; Causes of Death, Etc.

There are two classes of enemies which annoy the martins much and likewise wear my patience.—The English Sparrow, which fights them at their homes, and the men and boys who delight to run about the outskirts of town and shoot everything that wears feather. For the former I have an easy method of riddance, and that is by the use of powder and shot. For the latter I have the State law making it a misdemeanor to kill insectivorous and song birds; but this way of abating the nuisance is disagreeable as more or less personal strife and hatred is aroused through prosecution. However I do not hesitate to bring these parties to justice when I can gather sufficient evidence to indict them. This I was able to do in 1898 when a young man shot one of my nesting birds near our house. The prosecution of this young man had a wholesome effect on the shooters, who have generally kept the danger of killing martins well in mind. But costly experience is apt to be neglected or disregarded after a lapse of time, and such proved to be true in this case for during the past summer, 1902, my birds were disturbed by shooters, and I was obliged to bring two of these parties to justice.

There is a class of college students, and other young men, who go boating for pastime, who, I am told, often take a small rifle along and shoot birds along the creek. I have had evidence, a few times, that my martins were among the victims, and once when I sent a watcher along the creek, the shooter was saved prosecution only by his poor marksmanship.

The sparrows, if left unchecked, will reduce a good sized colony to a few pairs by driving them away. By this I do not mean that they can worst the martins in a fight, for the martins are good fighters and can rout the sparrows in short order; but in the absence of the martins, the sparrows carry out the eggs, and young and in a half hour's time will almost fill a room with straw and rubbish which they pack so tightly that it requires hard pulling with an iron hook to dislodge it.

The sparrows kill the young martins by pecking their skulls or necks; they then throw them out and start building a nest for themselves. Occasionally I have discovered a sparrow sneaking about the boxes, without any apparent intention of building a nest, watching for an opportunity to kill the young birds. At one time a male sparrow killed and threw out seven small nestlings before I brought him down. He was always on the alert and had a sly way of slipping from the box and hiding in the trees or vines when a member of our family appeared, and easily detected me endeavoring to get a shot at him, no difference how I tried to conceal myself. But during the third day of his persistent murdering, I got a glimpse of his head as he stretched up over a grape leaf to get a peep at me, and then quickly drop back out of sight. I had him well located this time, and firing at the leaf I brought down the murderer from behind it.

For shooting the pests, I use a small rifle—22 calibre—and dust shot shells and seldom lose a shot. During the summer months I kill upwards of three hundred sparrows which I find paying attention to my martin houses. To secure a good colony of martins it is necessary to get rid of the sparrows. I do not allow a single pair to nest on my premises; and the bird houses I erected for the martins only.

Several times I have picked up dying martins which had struck against the telephone wires in dropping down to one of the boxes. A pair of these wires connecting our telephone and passing about fifty feet from house No. 3, caused so much annoyance of this nature that I had the telephone company change it; substituting a pair, heavily insolated and twisted together, which the birds see easily, even at dusk. The wire also serves for a perch, often as many as fifty birds collecting on it in front of their box.

Three or four times I have discovered cats crouching in the grass waiting for the birds to get to fighting and fall to the ground. Once I chased a cat home which had caught one of my birds, but I was too late as the bird was dead. My feline friend came back, however, in less than twenty minutes, and as he again crouched beneath the box, I sent a rifle ball through his body which had the desired effect. At two other times I have been obliged to kill cats that loitered on the lawn beneath the bird houses.

Excessive heat is the cause of the death of many young birds, who becoming almost suffocated in the nesting rooms, venture outside and fall to the ground, injuring or killing them.

By far the greatest factor in causing the death of my martins in any one season, visited them during the summer of 1902, when more than half the young died of starvation, superinduced by a cold wet spell which set in June 27th, just when many young birds were about old enough to leave their nests. This period lasted a week. during which time at least one hundred and fifty young and several old birds perished. Depending entirely on winged insects, which could not be found during such bad weather, entire broods died from lack of food. The old birds, too, suffered much and presented a pitiable sight going out through rain and a chilly atmosphere in search of food for their nestlings, but returning, only to perch at the door to their rooms and watch the death agony of their starving young. Their actions also told of their anxiety and fear ;—flying to and fro about their houses, or resting on the telephone wire giving vent to their feelings by twitterings and notes that seemed more like grief and distress than their usual jubilant chatterings.

Off to the South.

About July 25th., the martins from all the bird houses in town begin to collect in a flock in some convenient place, generally

Plate III.

One of the homes the martins deserted in August, 1901, from a photo taken Sept. 7.

The foliage surrounding the base of the pole is a bed of canna lilies, which, at the time the birds left for southern climes, were in the zenith of their beauty, some of the bloom-studded spikes reaching eight feet in height. To the left and back of the cannas a vine arbor stretches away to the southward.

where they can rest on the dead branches of tree-tops; but sometimes on buildings and telephone wires.

This flock is augmented daily by new broods as they are old enough to quit their respective boxes, until, by the middle of August, hundreds, sometimes reaching well above the thousand mark, are to be seen. They do not remain together all day long but separate in several companies and visit their respective homes; and if there happens to be a late brood still in a box, particular attention is given to it in an effort to induce the young to join their ranks.

It seems strange that birds which brave the early spring squalls and cold snaps, as do the martins, should leave for their southern sojourn almost in mid-summer. But such is the case, and by the 20th. of August, some seasons, the bulk of the birds of this vicinity have departed, and by the last of the month all are gone. Only on two occasions have I recorded the birds in September.

Following are my records by years commencing with 1896:

1896.—Bulk left to day, 17th. August. One young did not leave its nest until 29th., and after 31st. neither it nor the old brids were seen.

1897.—August 16th., noted flock of one thousand or twelve hundred martins, which had been gathering in force since July 25th., and lingering along the creek, perched in the dead tops of trees. Aug. 17th. only twenty birds seen and on the 21st. six were noted.

August 27th., a few noted each day up to date when a flock of about one hundred birds were seen over town.

1898.—Agust 28th.; up to this time the gathering flocks have escaped my observation, since about the 5th. or 6th., when I saw a flock of about two hundred birds. The flock seen on the 28th., numbered between seven hundred and eight hundred birds, and were seen soaring about and resting on the telephone wires and cross arms along E. High St. On the 29th, a scattering flock of thirty were observed; and as late as September 4th., nine of these still lingered in the vicinity, but these were undoubtedly the parents and young of two late broods reared in the bird house of Mr. Jasper Dulany, in the eastern part of town, as they staid there during the night.

1899.—Bulk left on August 24th., and only few noticed during the next three or four days.

1900.—Bulk left August 22nd.; last seen August 30th.

1901.—Bulk left August 20th., but small flocks seen daily up to 29th. when all disappeared.

1902.—August 22nd. bulk left this town and only a few noted afterward. Sept. 6th. three male martins seen in a large scattering flock of Chimney Swifts.

A Chapter on a Cabinet Series of Their Eggs.

I have robbed my pets but I do not wear their feathers in my hat!

If there is an ornithologist who knows so much about birds that he needs to know nothing about their eggs, he would better pass this chapter by; for in it he will find what he styles, through plain ignorance, or a willful negligence of the subject, "bird murdering" and "egg hogging."

Fortunately for the birds, the Creator has endowed them with maternal instincts, which prompts them to renewed parental efforts when fortune loses to them their newly laid eggs, and, indeed, in many cases, callow young.

During the seven years in which I have been fostering and protecting these birds, I have taken, for a study of the shells and their contents, eleven sets of eggs, one of which was deserted, having been deposited in a room without the vestage of a nest. In every case, except the latter, it was observed that in from two to five days after the robbery was committed, the parents were reconstructing their old or building new nests. I do not know why the one nest was deserted, but in all probability, one or both old birds met death in some way.

Of the eleven sets of eggs, one is of seven, four are of six each, four of five, one of four, and one incomplete set of three eggs which was the deserted set. These and a set of four eggs, collected in Missouri, comprise my series—sixty-two eggs in all. The coloration is uniformly clear white, with little or no gloss, throughout the entire series; but in shape and size there is great variation. Thirty-five of the eggs are elliptical ovate, which was observed to be the prevailing type of those undisturbed, nineteen are ovate and three are elongate ovate, but throughout most of the sets, there is a tendency to irregularity in contour.

The average size of the sixty-two eggs is .96x.68 inch, but only one egg in the entire group exhibits the measurements in both diameters;—a common size is .99x.68 inch. The largest specimen measures 1.08x.68 inch, but this is one of the elongate eggs and several exceed it in short diameter, three being .72 inch. The smallest egg belongs to a set of four and measures .88x.62 inch, but the average size of this set is .91x.63 inch. The average size of the set containing the largest egg is 1.02x.70 inch.

Grouping the sets, according to the number of eggs, I find the greatest set average in the set of three, and the smallest in the set of seven eggs, which would seem to indicate that the larger the number of eggs in a set the smaller the size. But by comparing the intermediate sets I find the exact reverse is true, although the variation is only slight. By reference to the following table, this peculiarity will be seen:

Average size of set of 7 eggs, .92x.68 inch. 7 eggs.
Average size of sets of 6 eggs, .98x.68 inch. 24 eggs.
Average size of sets of 5 eggs, .96x.67 inch. 20 eggs.
Average size of sets of 4 eggs, .96x.66 inch. 8 eggs.
Average size of set of 3 eggs, 1.02x.70 inch. 3 eggs.

The shell texture also exhibits some variations, running from smotth close grained to a barely granulated surface.

In fresh eggs the yolks were of a pale yellow or lemon color, and easily broke in escaping the blow-hole.

On the Construction of Houses.

I have constructed a dozen or more bird-houses, besides those shown in the engravings, and, in each case, have followed the architectural design of some building, making the box the model of some residence or other building.

House No. 1, used by my martins, is a four-gabled, twenty roomed structure with central cupola and four chimneys. No. 2 represents a miniature residence and contains thirty-four rooms. No. 3, contains forty-five rooms, and is patterned something after the Pennsylvania State building at the World's Fair at Chicago.

Owing to the manner in constructing the houses the rooms vary greatly in size, but none are less than fiv inches square and six inches high, and none are larger than six by seven by eight inches. Nearly all the rooms in house No. 3, are four and one-half inches wide, seven inches high and eight inches deep. Entrances to the rooms are made to represent the open lower half of windows and measure two and one half inches square. Round opening are made two and three-fourth inches in diameter. Only one opening is cut into a single room. The birds will not build their nests in rooms with more than one entrance, without first obstructing one opening with mud.

Clean poplar lumber should be used in all exposed portions and the bottom should be double thickness, of ⅞ inch oak. The mode of attaching to the top end of the pole is by means of four angle irons screwed to the bottom of the box and to the sides of the pole. Or when an iron pipe is used, the angle irons are riveted to a piece of wood, and made small enough to slip down into the pipe.

House No. 3, shown on plates, weighs about two hundred and fifty pounds exclusive of the pole, which is of four inch gas pipe. This one is provided with a large hinge, near the ground, which enables me to lower the house in the fall and place it in the dry during the winter.

GLEANINGS

Nº II.

THE HAUNTS OF THE GOLDEN-WINGED WARBLER.

GLEANINGS

No. III.

THE HAUNTS OF THE GOLDEN-WINGED WARBLER.

(HELMINTHOPHILA CHRYSOPTERA.)

WITH NOTES ON
MIGRATION, NEST BUILDING,
SONG, FOOD, YOUNG
EGGS, ETC.

ILLUSTRATED.

By J. WARREN JACOBS.

WAYNESBURG, PA.,
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GLEANINGS NO. II, 1903, THE STORY OF A MARTIN COLONY.

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For sale by the Author, 35 cents a copy.

INTRODUCTION.

A special interest in the little Golden-winged Warbler has remained with me ever since May 22, 1891, when I found them nesting for the first time. For a few years previous I had known the bird only as a migrant, as I supposed, and passed them by even to the middle of May, at which time in later years I found them to be regular,—not to say abundant,—breeders.

Observing that no great amount has been written on the life history of this species, I have undertaken the compilation of this paper, as a contribution to existing knowledge, using data and records personally collected during days spent in their haunts.

During the past few years, efforts were made to secure a photo of the old bird on or near the nest, but after hours of waiting with the anxious birds only a short distance away, I was each time compelled to fold my camera and give up the attempt. The mother bird is rather tame and allows a close approach to the nest, not leaving until the hand is thrust down almost upon her; but when once disturbed she will not return until the intruder is well out of sight. At the last nest I found in 1903, two attempts were made to get a photo of the sitting bird but each time, just as I got the camera placed, the mother became suspicious and slipped away, and although I went quite a distance away and hid in a clump of briers, she would not approach the nest while the camera remained near.

In June, 1901, I got a picture of a young bird which had just fluttered from the nest, and a half-tone of this is shown with the plates.

The Color Chart was prepared after a careful study of the eggs and their coloration.

The plates were made from photos by the author, and are accompanied by proper explanations.

Waynesburg, Pa. J. WARREN JACOBS.
March 1, 1904.

The Haunts of the Golden-winged Warbler.

—Its Summer Home.—

During the breeding season the Golden-wing is irregularly distributed throughout this part of Pennsylvania. A long stretch of ridge land with patches of dry, leafy forests, cultivated fields and cleanly kept pasture lands, is no place to seek the home of this little fellow. But immerge, after hours spent in exploring hundreds of acres of such land, into a field abundantly supplied with damp or springy places, with rank—but closely rooted—grass, clumps of bushes, briers, etc., and the adjacent forest skirted with a like growth, and the birds can be found.

If the field be a large one, more than one pair of birds may be expected, but a whole day's search may not reveal a nest. A field of fifteen acres, bordering an undergrowth woods and having other favorable conditions is almost certain to be the home of one pair. Smaller tracts do not always possess a nesting pair, but here and there a very small favorable nook of less than a quarter acre, in the edge of a woods is selected, and two such places entirely surrounded by woods was inhabited annually until the undergrowth crowded out the grass. One of these places was still used during 1903 where, within a few feet of a former nesting site, I found a nest containing two young of the Warbler and one of the Cowbird. I have never found a nest in the creek bottom lands, but always well up the side or on top of a hill.

Four different places which contain nesting pairs every summer have been selected for description in this topic, which, with their accompanying plates, should give a good idea of the summer home of this bird.

Rush's Hollow Is situated one-half mile south of Waynesburg, is a narrow and deep ravine, rocky and almost perpendicular near its junction with the Smith Creek Valley.

Some two hundred yards up its torturous course is a beautiful minature water-fall, about twelve feet high, just below where the little brooklet emerges from the woods to sparkle in the sunlight for a few moments, before it leaps over the shelving rocks, spatters on the boulders below, and disappears in the depths of the gloom beneath the mingling branches of the undergrowth and the tall oaks, maples, hickorys and elms which shroud the deep recess from ledge to ledge. A rod above the falls, and in the edge of the brook, stands a huge willow tree, which, until a few years ago, spread its branches over considerable area; but an axeman selected this particular tree for destruction and deep through its bark his ax cleaved a circle around the enormous trunk, bringing death and rendering desolate a beautiful spot Mother Nature spent a century in perfecting.

Here in the noon-day shadow of this great tree, May 22, 1891, began my first acquaintance with the Golden-winged Warbler in its summer home, and simultaneously commenced my study of its life history. Passing this way on the day mentioned, I was greeted with the song of the Golden-wing, which had become familiar to me in previous years when I considered the bird only a migrant. But the lateness of the season for a comparatively contented migrant, impressed me that a few of these rare warblers might be found nesting with us. A happy thought indeed, for while I was trying to locate the little songster up among the willow foliage, I chanced to pass near a small thin clump of briers where, down by the base of one, and nestled in the springing grass a little bit of astonishment awaited me.—A Golden-winged Warbler cosily jostled down in her nest, with her bill and tail protruding above the deep curvature of her back, and her little sparkling eyes peering at me with an anxious, questioning look. I could hardly believe my discovery—but it was true. Anxious to know what treasures her body protected, I cautiously flushed her from the nest, forgetting for a time, her watchful mate in the willow branches overhead. Her sharp "chip" brought him to

Plate I.--Rush's Hollow.

North side of woods bordering pasture fields. At the time this picture was taken, (Sept. 10, 1903), the field presented a bright yellow appearance with blooming golden-rod.

An x indicates the location of the nest figured on Plate II.

COMPLIMENTS OF THE AUTHOR

Plate II.—Nest and Eggs in Situation.

Beneath the ox-eye daisies on the border of the north side of Rush's Hollow. June 6, 1903.

her side and together they flitted to and fro among the lower willow branches and through the brier clumps near at hand. The nest contained one little egg of her own and one of the Cowbird (Molothrus ater). The latter I removed to induce the mother warbler to lay a full complement, if possible, for, without the "ifs" and "ands" of a lengthy explanation here, this nest and eggs were to go into my cabinet and to form a part of this study, and to be, as far as possible, beneficial to science. Going back the next day I was glad to find the removal of the parasitic egg was a matter of little concern to the mother bird, who slipped away from the nest, revealing two beauties of her own. On the 26th, when I went to take the nest I was disappointed to find that no more eggs had been deposited; but in lifting the nest I found the third egg resting between two blades of grass and uninjured, save for two soft spots in the shell where it came in contact with wet grass. This egg may have been displaced by the Cowbird when she deposited her's as it was fresh, while the two in the nest were slightly incubated.

The location of this nest was the nearest to the creek bottom lands of all the forty odd nests which have come under my observation during my experience with this species.

Returning to the description of this hollow, we find the contour changing as we follow up the course of the brooklet, —the high hills becoming less steep. The woods starting one hundred feet above the nest, begins with numerous sugar maples, the trunks of which bear scars of an old time sugar camp. For quite a distance up the hollow most of the large trees are of this species; but gradually oak, beech, elm and hickory trees replace it; here and there gum, wild cherry and chestnut trees are seen, and around the head of the hollow numerous locusts and a few walnuts grow. The elms are not numerous, and the beeches grow chiefly on the steep sides of the four short ravines which reach out from the main hollow into different directions forming its head. Across this expanse great oaks tower above all other trees. The woods itself is not over twenty acres in extent and of rough triangular shape; its length lying with the brook. The undergrowth consists of witch-hazel shrubs, dogwood, ironwood, beanwood, scrubby beech and crab-apple bushes and wild grape vines (the small, bitter variety) in profusion.

The sloping hillside around the woods is used as pasture land and is pretty generally grown up in brier clumps and numerous crab-apple and hawthorn bushes. A large oak, a chestnut and some locust trees still remain in the field. The hill-top surrounding the hollow reaches far above the tops of the tallest trees in the woods. Acres of the field on the north side of the hollow are abloom with ox-eye daisies at the time the birds are nesting.

On the margin of the woods the song of the male Golden-wing is heard as he flits from tree to tree in his never tiring search for insects. Somewhere outside the line of the forest, but within the shadow of the trees, his nest is secreted away, down among the grasses and young brier stalks. It may be near the tree in which he sits or a hundred yards along the border on either side, or across the forest to the other hillside. Anyway he seems contentedly believing his little mate will not divulge the facts And unless a very diligent search is made, the secret will remain with the birds to the end.

Other localities of more restricted areas do not furnish this protection, and to find the nest is an easy matter.

At least two pairs haunt the outskirts of this forest and the adjacent fields.

Sayers' Woods. Emerging from Rush's Hollow, at is junction with Smith Creek, we stand facing the spur of a ridge two hundred feet high and about one and a half miles in length, the upper half of which, until a few years ago, was heavily covered with mixed timber and undergrowth. This ridge forms a part of the eastern slope of Smith Creek Valley, and the wooded part has long been known to me as Sayers'

Woods. In recent years, the ax has driven its keen edge through most of the fine large trees, and the plow has loosened the roots and transformed sections of the original forest into grassy fields. But still there is a considerable part of this virgin forest left.—Perhaps eighteen acres in one tract, and around the end of the spur and over its crown and down into the hollow on the opposite side a patch of about forty acres remains.

All around the border of this woods are pasture lands, chiefly grown up in places with blackberry and raspberry briers, crab-apple and hawthorn bushes, wild strawberry vines and luxuriant blue grass, intermingled with thistles, white-top, blue-devil and other rank growing weeds, which are springing into a good start when the Golden-wings choose a nest location among them.

This ridge is abundantly blessed with water, several springs giving out a cold sparkling stream throughout the hot summer months;—two of these, and the best ones, quite near the top.— At many other places there are small swamps or boggy ground. Nowhere is the hill very steep, and the field below the line of the forest becomes in some places, nearly level, until the bluff overlooking the stream is reached, and here is an abrupt break from ten to twenty feet in height, with rock ledges protruding in places, and in some places thickets and remnants of the original forest.

All along the lower border of the woods, and about the clumps of bushes in the fields are the haunts of the Golden-wings. Here is where I first see the birds in the spring, and is the region most productive during the nesting season. Generally along the outskirts of the woods,—just where the vegetation changes to briers, bushes and elders, with a goodly mingling of grass, the birds select a site for a nest. Formerly about six pairs nested at random throughout this area, but since so much of the woodland has disappeared, not more than three pairs can be found.

It is an easy matter to determine the number of nesting pairs by their song, but to find the nest in this expanse of neglected land, while the bird is sitting, is quite a different thing, so well do they conceal their domicile. Long, arduous search at different times during their breeding season, has never revealed more than three nests during the summer, and always one or more were deserted before or after discovery. Twice have I found bright little youngsters,—about ready to leave the nest,—within a short distance of ground previously covered.

Altogether about twenty nests have come under my notice here, eight of which contained the complement of eggs. All others, except the two containing young birds were subsequently deserted.

The Newell House Field.

Rounding the south end of the "spur" already mentioned, a good view of "Dungeon" or "Barnes' Hollow" is had where some of my studies have been pursued. But lying adjacent to the spur is "Newell House Field," which next to the "Sayers' Woods" region has been my best favored spot. In fact it may be considered a continuation of the same territory, for it is the same woods crossing over and around the south end of the spur, and down into and extending along the hollow which forms the western margin of the Newell House Field. This tract of land is used for pasturing sheep and cattle and is much like the one adjoining Sayers' Woods, but is larger and the soil affords a more luxuriant growth of briers and vegetation, and has numerous tree-clumps and many scattered maple, locust, walnut and formerly, chestnut trees.

The field reaches nearly to the top of the hill, where an oak grove and a small, narrow strip of original forest is encountered. This hill is the main ridge to which the spur belongs and at the grove is slightly higher than any part of the spur.

Plate III.—Newell House Field—Summer Scene.

Looking north from the "spur" southwest of Dungeon Hollow.

For ten years I have found the Golden-winged Warbler nesting at random throughout this neglected field; especially has the section to the right of the center of the picture been productive.

Plate IV.—Barnes' or Dungeon Hollow.

A little nook well to the head.—Just over the fence is a little water fall a few feet below where two little brooklets—one coming from the right and one from the left—join.

The x indicates the location of a nest, containing four eggs, found May 28, 1899. Seventy-five yards back of this nest another was found (May 14) and in a line between these two points, two other occupied nests were found at different times—one of them among the briers and bushes. Two nests were found among the trees and bushes near the left margin of this picture.

The young bird was photographed June 9, 1901, just after it had fluttered from its nest along the border of the woods crowning the spur southwest of Dungeon Hollow.

Four pairs of Golden-wings nest annually in this field, but four days of diligent search would not reveal all their nests, for almost every yard of the entire expanse is a fine hiding place for them. This coupled with the irregularity of the different pairs to begin housekeeping, and the large percentage of deserted nests, renders the finding of eggs or young difficult.

Dungeon or Barnes' Hollow.

The little brooklet which babbles over the pebble beds, and dashes against rocks, in its hurry down the wooded hollow bordering the Newell House Field, joins the larger brook,—which drains Dungeon Hollow and its surrounding hillsides,—a few hundred feet from its junction with Smith Creek.

The main ridge mentioned in the preceding topic, extends half-way around this hollow, culminating in a knob known as "Barnes' Knob,"—the highest elevation for miles around.—Here it deflects to the eastward, but throws out a "spur" which extends on around Dungeon Hollow and terminates near the end of the Sayers' Woods "spur." Thus we have the Newell House Field and the Dungeon Hollow region almost enclosed by this ridge and the two "spurs." Between the ends of these spurs the brook cuts its way through a very narrow strip of bottom land, carrying the waters gathered from nearly a thousand acres.

More than a hundred acres of forest still remain in the Dungeon Hollow region, the major part of which is in one piece on the east hillside, extending from the run half-way up the hill and across the ravines. A good sized tract crowns the "spur" on the south and west.

Most of this land is not held in very high esteem by the Golden-wings,—a smaller amount of the cultivated fields being given over to briers and luxuriant vegetation. The upper parts of the woods being dry, and occupied by red oaks, black oaks and other trees, and is without undergrowth.

A small briery nook in one place above the woods on the east side has its pair of birds, and likewise the border of the hill-top woods on the west; but the birds with which I am intimately acquainted reside, during the summer, near a beautiful little water-fall pretty well up to the head of the hollow where the two main forks join. Here the "zee-ze-ze" song of the male bird greets me every summer; and the suitable nesting ground being restricted to less than an acre, makes finding the nest an easy matter, as compared with larger areas. About two hundred yards farther up the right hand branch is another small spot where I have frequently heard the birds, but they undoubtedly were the same pair feeding.

Migration, Sociability, Nest Building, Etc.

The date of arrival in this locality varies with weather conditions. The earliest being April 20, and the latest May 3. Fine warm days beginning about the middle of April, generally start, in a short time, the buds of forest trees and bushes, and at this time is when the Golden-wings begin to arrive. No time during migration have I observed more birds than during the summer months. This fact leads me to believe that this bird's habitat is restricted to certain localities and to reach their destination they travel by different routes. Certain it is that all those making this part of their range their summer home, arrive about the same time.

My records for departure in the fall are somewhat meager, having a record for Sept. 21, and several for a week earlier.

While appearing rather shy, the Golden-wing is not adverse to nesting in close proximity to many other species. I have found their nests within a few yards of Field, Song and Chipping Sparrows, Maryland Yellow-throat, Yellow-breasted Chat, Indigo Bunting, Kentucky Warbler, Cardinal, Yellow-billed Cuckoo, Bob-white and Towhee, once being within four feet of the latter and incubation progressing in both.

Where they seek their food they come in contact with all the species, from the powerful Red-tailed Hawk to the Ruby-throated Hummingbird, commonly found breeding or feeding in our hill-side forests and neglected brier fields.

They do not associate together much, except immediately after their return from the South, when three or four males have been seen to chase one another through the undergrowth on the border of the forest.

Nest building does not occupy very much of their time and yet when completed, the domicile is rather compact and neatly cupped, but on the whole is very bulky for a bird so small. The base is composed of dry oak and beech leaves, and other leaves which dry hard, glossy and without crumpling; on top of this heap a more compact structure is made, the leaves being placed points downward; then comes a goodly supply of strips of grape-vine bark and shreds of inner tree-bark, so placed that the rough ends extend above the rim of the nest. A lining is then put in place, consisting of fine grass stems and, in some cases, long horse hairs. A strict lining is not always put in place, some birds being content to rest the eggs on the grape-vine bark and a few intermingling grass stems. Although constructed of coarse materials, the inside of the nest presents a neat appearance, the long shreds of bark and grasses crossing diagonally, much resembling basket work.

The opening is not straight down, but slightly tilted, the jaggy leaf-stems and bark sometimes reaching two or three inches above the rim of the nest proper. As incubation advances, the rough rim on the lower edge of the nest becomes broken down, and by the time the young birds are ready to leave, this part of their home is worn smooth by the attendant parents.

The nest is hardly ever placed away from some substantially supporting stalks of weeds—new or dead,—briers, elders, sprouts, etc., of not sufficient abundance to hinder a good growtn of grass. One nest was placed above the ground, be-

Plate V.—Nests and Eggs in Situation.

Upper figure from Newell House Field, just to the right of the woods in the middle of the picture (See Plate III), June 2, 1901. Lower figure from Dungeon Hollow region, fifty yards back of the fence (See Plate IV), and among the trees and bushes on the left.

ing three inches up in a clump of iron-weeds in a marshy place.

Two days seem to be ample time for the birds to complete a nest, and in more than one instance I have, a nest commenced one day contained an egg the second day thereafter.

The outside measurements of seventeen nests vary from 3.6 to 5.0 inches in diameter, and 3.0 to 5.0 inches in depth; and on the inside, from 1.7 to 2.5 inches in diameter by 1.3 to 2.5 inches deep. The average size of the whole lot being 4.3 inches in diameter by 3.6 inches deep on the outside, and 2.2 inches diameter by 2.2 inches deep on the inside.

Many nests are deserted before completion on account of continued wet weather, or because of browsing cattle disarranging the vegetation near them. At other times nests containing eggs were deserted for the same cause, and another was upset and the eggs trampled by a clumsy steer. When, from any cause, the nest is destroyed or taken from the birds, they set about in two or three days, building a new one not far from the old site. I have found as many as three partly built nests, within a small area, all the work of one pair of birds during a period of ten days or two weeks, and all deserted on account of roaming stock.

The only evidence of enemies I have found, was a nest literally torn to pieces and the feathers of the mother bird strewn about, evidently the work of a domestic cat or other such animal.

Deposition and Number of Eggs, and Their Arrangement in the Nest; The Cowbird's Egg and its Effect;—Incubation.

Seemingly before the birds have had time to complete their nest, the female begins the deposition of the eggs. Generally where I had opportunity to watch the nests daily, or at intervals between the beginning and completion of the set, the eggs were laid on consecutive days, but in two or three instances it was noticed that the laying missed a day.

A nest just completed on June 2, contained a full complement of four eggs on the 9th. Another nest about completed on the first of June contained four eggs on the 8th. One commenced on the 15th of May contained four eggs on the 22nd, and in this case the female had missed a day during the laying, and one observed to be about one-half done on May 14, contained five eggs on the 21st, four of which were very slightly incubated.

From the evidence at hand, the height of the laying season is from the 14th to the 24th of May, Five nests, containing eggs were found in June—the last one on the 13th containing three slightly incubated eggs;—and before the 14th of May no full nest complements were found, but a record for young ready to leave the nest on the 28th shows that the first egg must have been deposited about the 5th and the set completed by the 10th.

Sometimes they desert their eggs after the nest becomes badly water-soaked from continued rains, but in fourteen days, as I have observed on three occasions, the second nest was built and the laying completed.

A fact I have observed when the set was a large one—of five or six eggs (which may or may not include a Cowbird's eggs),—the eggs were arranged in two straight rows with the points dove-tailing, and the whole extending lengthwise the sitting bird's body.*

The number of eggs to the set varies from three to six; the latter number being extremely rare, while all but one of the sets of three contained an egg of the Cowbird (Molothrus ater), so that these small sets were undoubtedly incomplete. One set each of four and five eggs contained an egg of the Cowbird.

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*This pecularity of arrangement is seen in large sets of other Warblers, and is of frequent occurrence with Kentucky and Worm-eating Warblers, Louisiana Water-Thrush, Ovenbird, Maryland Yellow-throat and Yellow-breasted Chat.

More nests contained four than five eggs, and this number is therefore the prevailing complement.

Four nests contained 3 eggs each.
Nine nests contained 4 eggs each.
Five nests contained 5 eggs each.
One nest contained 6 eggs.
One nest contained 2 eggs. (This one undoubtedly incomplete.—Nest also contained a Cowbird's egg).

In the sets containing the Cowbird's eggs, incubation was progressing from slight to advanced in all but the set of five which was fresh.

The interference of the Cowbird is the cause of small sets being found, and certainly the cause of one of the eggs in the set of five being dented, and of an occasional egg of the Warbler being found on the ground outside the nest.

At the beginning of the second day after the completion of the set incubation begins to blood-tinge the eggs, and on the fourth day the flesh of the embryos begins to form and in ten days the young are hatched out.

Fresh eggs, as they lie in the nest, are very beautiful indeed, exhibiting a fine, rich, cream-buff color, which is intensified by the yolk. As incubation progresses, the egg shell whitens in appearance until it is snow-white at the time incubation is about one-half complete. After this stage is reached, the shell appears very glossy and turns a leaden hue, which deepens until the young bursts it into fragments.

Very few eggs hatch before June 1, but on May 28, 1899, I found a nest containing four young, two of which fluttered out when I placed my hand near them. These youngsters must have hatched on or about the 19th, and the laying completed on the 9th or 10th, which is four days earlier than my earliest record for finding a full nest complement, which was on the 14th of May, and consisted of four fresh eggs. My latest record for eggs is June 13th, three of the Warbler and one of the Cowbird, all slightly incubated. These should have hatched out in seven days. Thus it would appear that May 10 and June 20 are extreme dates for the female to brood her eggs.

Song, Food and Young.

The song period begins upon their arrival from the South, and continues throughout the nesting season, which owing to weather interruptions, and annoyances by domestic animals, extends throughout May and June.

While the female is incubating the eggs, her mate moves about the tips of branches and tops of saplings, searching for food, all the while singing his little ditty, which is a simple little bit of bird music hard to put into print. At some distance the song can be distinguished by the sylables "Zee-ze-ze-ze-ze," beginning slowly and proceeding more rapidly, ends in a slightly higher pitch. When near the bird this song sounds somewhat different, and now is when it is hard to imitate in type. The best I can do is to write it zee-u-ee'—zee-u-ee'—zee-u-ee'—zee-u-ee'—zwee', with the "u" barely articulated.

I have several times heard the song continued to the middle of July, and again on still sultry days in August. At this time, however, it is not so strong and complete as during the early summer. While emitting this song, the bird stands quite erect, stretched up to its full height, throat extended until the feathers ruffle. The head pointing about 70 degrees upward when the first syllable is uttered, is turned farther upward at the close of the song.

The alarm note of both sexes, when the nest or young is disturbed, consists of a sharp "chip" like that of the "Chipping Sparrow," but sharper and repeated oftener.

This bird must be a great destroyer of leaf lice and small caterpillars that infest the tips of branches and the underside of leaves, for they are continually searching and picking at the opening buds and waxen leaves at the ends of new twigs, the male pausing frequently to sing. At times their actions remind one of the Gnatcatcher in flitting hither and thither snatching up small winged mites.

It is impossible to ascertain, even with a good glass, what they secure in their search, so difficult it is to watch them up among the leaves. By personal examination I have found numerous brown and green leaf-lice, and little "hump-back" winged mites on the leaves and twigs where the birds were picking.

Much of the food brought to the young is of very small insects and not discernible, from the distance one must keep while watching the parents feeding their brood. Both old birds tend their young, and at times get quite busy, but as already stated the nature of the food is hard to determine. Once I saw a female carry a small brownish butterfly to her young; and several times I have discovered the birds taking small smooth green worms—such as strip the leaves of their green coat, leaving the ribbed skeleton,—to their nestlings. The legs of a spider protruded from a bird's bill as she approached her nest.

The young birds grow very rapidly, and in ten days, according to observations taken at various times, they are strong enough to leave the nest, but are not able to fly much, hopping and fluttering until they secure a position one or two feet above the ground, on a brier or bush. Here they settle down and assume a drowsy attitude, every few seconds emitting a peevish chirp, accompanied by a slight convulsive motion of the whole body, and a partial opening of the eyes. This is in marked contrast with their disposition while in the nest, where they huddle down deep into the domicile with their beaks protruding above the rim, and their little bright eyes blinking and carefully noting the intruder's every movement, If the hand is placed near the nest at this period of their growth, they will scramble out and flutter away, all giving vent to their chipping note, which brings down upon the intruder the wrath of both old birds, who fly close his face, snapping their beaks and chipping loudly; then down upon the ground they fall and feign the broken wing act as long as one of the young continues to chirp.

On June 9, 1901, I found a nest containing three young warblers and one of the Cowbird old enough to leave their home. Using great care I broke down the briers and parted the grass near the nest and was just ready to place my camera in position when away went the nestlings.

The commotion brought the old birds upon the scene, and for some minutes quite a din was kept up which brought Scarlet Tanagers, Vireos, Towhees, Kentucky Warblers and other birds to the vicinity. I placed the young back in the nest and kept my hand over them a moment until they became quiet, and again attempted to take a picture, but the birds scrambled away again. I missed a picture showing the way the young Cowbird jostles down into the centre of the nest, leaving the warblers to find room around the edge or fall overboard. These young birds could fly a short distance, and one which flew from my hand, lit on a dead branch three feet from the ground, and settled down in the usual way. Adjusting my camera I soon had his picture which is used in Plate IV of this paper.

The sexes can be recognized, the young males having two rather pronounced buffy bars on the wings, corresponding to the bright golden bars on the adult males.

A Study of Their Eggs.

While I have yet to harm one single feather of a Golden-wing's body, I have taken from the little birds, their nest and eggs.

No excuse for committing these thefts is hereby tendered bird students who, knowing so much about birds, can realize in the laying of a bird's egg, only a mere fact in Nature; except that this has been one of my ways of studying the birds and their life histories for the past twenty years. During this time I have found the robbing of birds for scientific study as conscientiously elevating as maintaining on my premises, at considerable expense, bird houses for the accommodation of a large and interesting colony of Purple Martins.

The first nest of eggs of the Golden-wing I collected, marked the beginning of a study of the life history of this bird, which, although incomplete as it is, has been highly interesting and instructive to me; and the last set added to my study series, contains the only truly oval egg of this species I have ever seen.

On the whole the eggs of the Golden-winged Warbler closely resemble those of the Maryland Yellow-throat (Geothlypis trichas), but by comparison and study of a number of sets of both species, the latter will be found to possess a stronger creamy ground; as a rule is slightly heavier marked, and with a redder tint of pigments, and in size average a trifle larger. The smallest eggs of the Yellow-throat are the size of the least specimens of Golden-wing, but there are no eggs of the latter as large as some of the former species.

Nearly one-half of the eggs of the Golden-wing I have seen are typical ovate, with variations running from sharply pointed to broad rounded ovate. Seventeen in my possession are true elliptical ovate, and a few vary from this by being short elliptical ovate, or nearly equally ended, and in this respect is a connecting link between the elliptical ovate and the true oval, of which there is only one specimen; three, however, are very nearly oval.

Eighty-one eggs,—all normal in size,—which I have measured, show an average of .64x.50 inch, three of the eggs exhibiting these measurements.

Sets of 3 eggs average .64x.49 inch.—12 eggs.
Sets of 4 eggs average .66x.51 inch.—36 eggs.
Sets of 5 eggs average .64x.50 inch.—25 eggs.
Set of 6 eggs average .61x.48 inch.— 6 eggs.

Almost one-half the nests contained four eggs and these showed the greatest average. Among these sets are also to be found the largest specimens, two in one set measuring .70x.52 inch, and singularly enough, the smallest specimen belongs to a set of four eggs, measuring .57x.47 inch. By a study of these measurements it will be seen that there is a much greater variation in the long than in the short diameters. The sets of five eggs have an average measurement of .64x.50 inch, which is the same as the whole average. The set of six shows small sized eggs and in this set there was little variation in size, ranging from .59 to .62 inch by .48 to .49 inch.

The shell is very thin, smooth, close-grained and with very little gloss.

As previously stated, the egg, found resting between two blades of grass outside the nest taken May 26, 1891, had soft places in the shell where it came in contact with the grass. After preparing this egg for the cabinet these flexible spots burst and curled inward, indicating that the action of the grass and dew had sapped the shell strength away, leaving only the lining in the middle of the spots.

The color of the shell would be considered white unless a close examination be made, whereupon it would take much thinking to persuade the student to believe a single white shell could be found in the series. There is not a really white egg in my study series of sets of this species, but many show only the barest tinge of cream. In several sets, especially those where the predominating dotting colors are of vinaceous and vinaceous-cinnamon, a strong creamy-buff tint is readily recognized in the ground.

Thirteen colors and tints occur throughout the series as shell decorations, and distributed with a varying degree of abundance, from sparingly dotted, with one or more colors or tints in some, to boldly blotched in other specimens.

These colors may be placed in classes of markings as follows:—

1st. Overlays, or erasable markings, which are always placed on the outside of the shell, without a permanent seat in its texture, and can to a very great extent, be washed, rubbed or scraped off. Burnt umber, liver brown, and chestnut are these colors, and in one case a few black lines were noticed. These markings consist of pinpoints, dots, a few zigzag scrawls and lines. Liver brown is the prevailing color of overlays.

2nd. Underlays, or permanent markings, which are always of the lighter shades, consisting of burnt sienna, vinaceous-cinnamon, vinaceous, pinkish vinaceous, vinaceous-buff, lavender, heliotrope purple, lilac and lavender-gray. These colors are placed both on the shell and rooted in it, or within the texture of the same, and cannot be washed or scraped off without taking away a part of the shell material. Burnt sienna is distributed only in fine dots and pinpoints, and is lacking on some specimens. The other tints and shades occur in either fine dottings or large blotches. Vinaceous, vinaceous-cinnamon and pinkish vinaceous are the predominating colors throughout the series.

COLOR CHART.

EGGS OF GOLDEN-WINGED WARBLER.

COLOR OF SHELL.

Fresh Eggs (Unblown.)	*After Removal of Contents.*
■	■
Cream-Buff.	*Faint Cream.*

MARKINGS.

Overlays. (Erasable.)

■	■	■
Burnt Umber.	*Liver Brown.*	*Chestnut.*

Underlays. (Permanent.)

■	■	■
Burnt Sienna.	*Vinaceous-Cinnamon.*	*Vinaceous.*
■	■	■
Pinkish Vinaceous.	*Vinaceous Buff.*	*Lavender.*
■	■	■
Heliotrope Purple.	*Lilac.*	*Lavender-gray.*

The distribution of markings is nearly always on the larger end or in an irregular wreath around it. Pin-points and small dots are the rule, but on boldly marked specimens, large irregular blotches of lighter shades are numerous. The darker shades are mostly small dots and pin-points, but specimens of four sets which I have examined, had fine hair lines running round the shell within a well defined wreath.

The amount of markings on the normal egg varies from thickly seated, covering about two-fifths of the ground, to scantily marked, or almost devoid of color pigments.

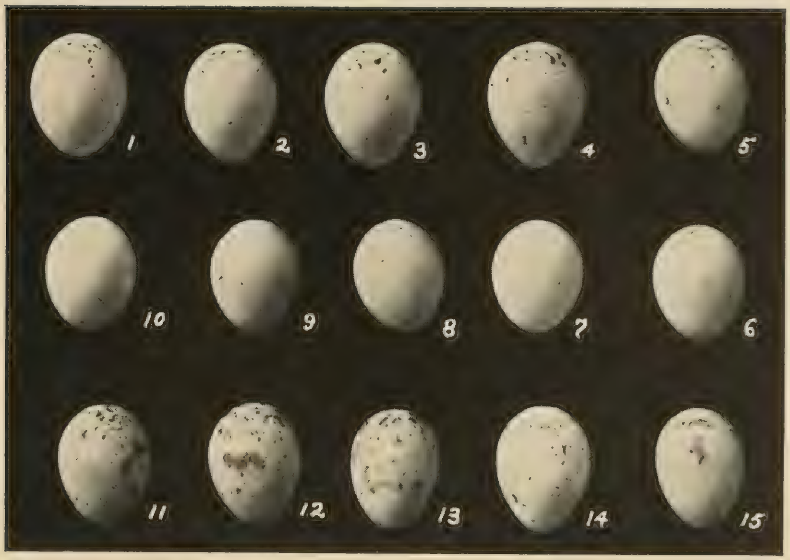
The accompanying Color Chart gives the color of fresh eggs as they appear in the nest; and the color of the specimen —whether fresh or incubated,—after removal of contents; and the tints of shell decorations. The underlays are not full strength colors, but appear to have a washed or milky tinge.

Ridgway's Nomenclature of colors was used as a guide in the make-up of this chart as well as in the descriptions of the sets figured on Plate VI.

Plate VI.—Eggs of the Golden-winged Warbler.

Natural size and showing relative distribution of markings.

Descriptions of these eggs are given under head of "Descriptions of Sets." Nos. 25 and 30 are eggs of the Cowbird (Molothrus ater) found with the Warblers' eggs.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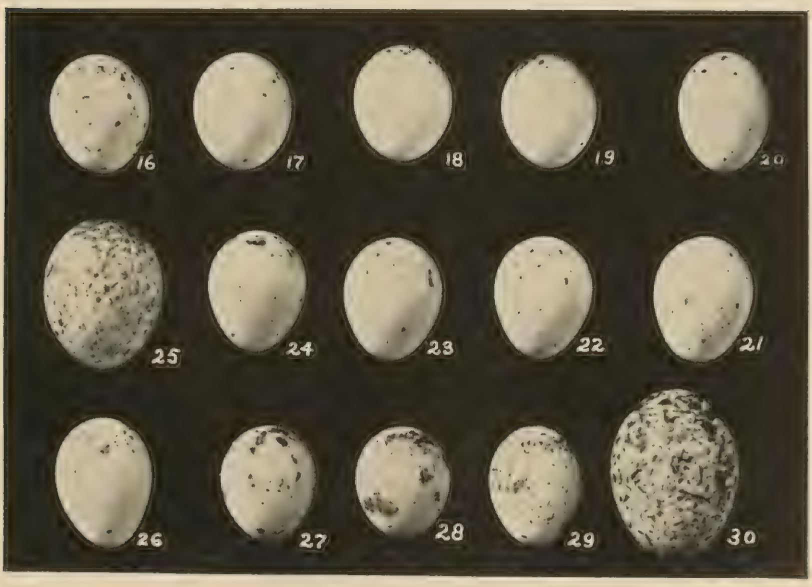
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Descriptions of Sets.—See Plate VI.

1, 2, 3, 4,—Collected May 20, 1894, near the edge of Sayers' Woods at the southern end. White with creamy tint, marked with specks, hair lines and small splashes of burnt sienna and umber, and a few faint markings of lavender-gray, vinaceous-cinnamon and lilac seated almost wholly in a ring around the larger ends; the hair lines being of zigzag pattern and found only within the wreath. Size .65x.51, .63x.49, .66x.51 and .66x .52 inch.

5, 6, 7, 8, 9, 10.—Collected May 19, 1897, southern end of Sayers' Woods; three feet from site of preceding set. Faint creamy tint;—in point of markings this is an abnormal set, two being entirely unmarked,—two are very faintly marked with barely discernible specks of liver brown and pinkish vinaceous, and two are moderately marked with pinkish vinaceous and vinaceous-buff; on one crowning the larger end and on the other, distributed in a beautiful wreath around the end. Size: .62x.49, .62x.49, .59x.48, .61x.48, .61x.48 and .62x.48 inch.

11, 12, 13, 14, 15.—Collected May 21, 1899. Midway lower edge of Sayers' Woods. In this the creamy tint ground is a strong characteristic. One of the two very heavily blotched sets. Markings over entire shell, but most abundant in a crown about the larger end and extending almost to the middle of the shell—uniform throughout the set;—large blotches of vinaceous, over which is diffused smaller blotches, spots and pin-points of burnt sienna, pinkish vinaceous and vinaceous-cinnamon and lilac. .66x.50, .66x.50, .65x.48, .65x.50 and .60x .52 inch.

16, 17, 18, 19, 20.—Collected May 24, 1897, in a small grassy nook in the Unks' Hollow Woods, one mile west of Rush's Hollow. Creamy tint, marked about the larger ends, where an irregular wreath is discernible, with vinaceous-cinnamon, and on one—the most heavily marked—much lavender is distributed. In this set the distribution varies from heavily to lightly marked. Size .64x.49, .61x.50, .61x.52, .62x.52 and .62x .52 inch.

21, 22, 23, 24.—Collected May 29, 1898. Sayers' Woods, 200 yards north of site of first set described. Contains a Cowbird's egg (No. 25). Faint creamy tint, thickly dotted with minute specks,—chiefly about the larger end,—of lavender and vinaceous- cinnamon and liver brown, and random splashes of vinaceous. Size: .68x.52, .65x.51, .66x.52 and .65x.52 inch.

26. The largest egg in the series and belongs to a set of four eggs, collected in the Dungeon Hollow region, May 28, 1899. Size .70x.52 inch.

27, 28, 29.—Collected June 13, 1897. North end of Sayers' Woods near the edge. Contains Cowbird's egg (No. 30). Another heavily marked type, similar to those of Nos. 11 to 15, but the large markings of this set are of vinaceous-cinnamon and the sienna points and spots less numerous. Size: .62x.51, .61x.51 and .65x.50 inch.

GLEANINGS

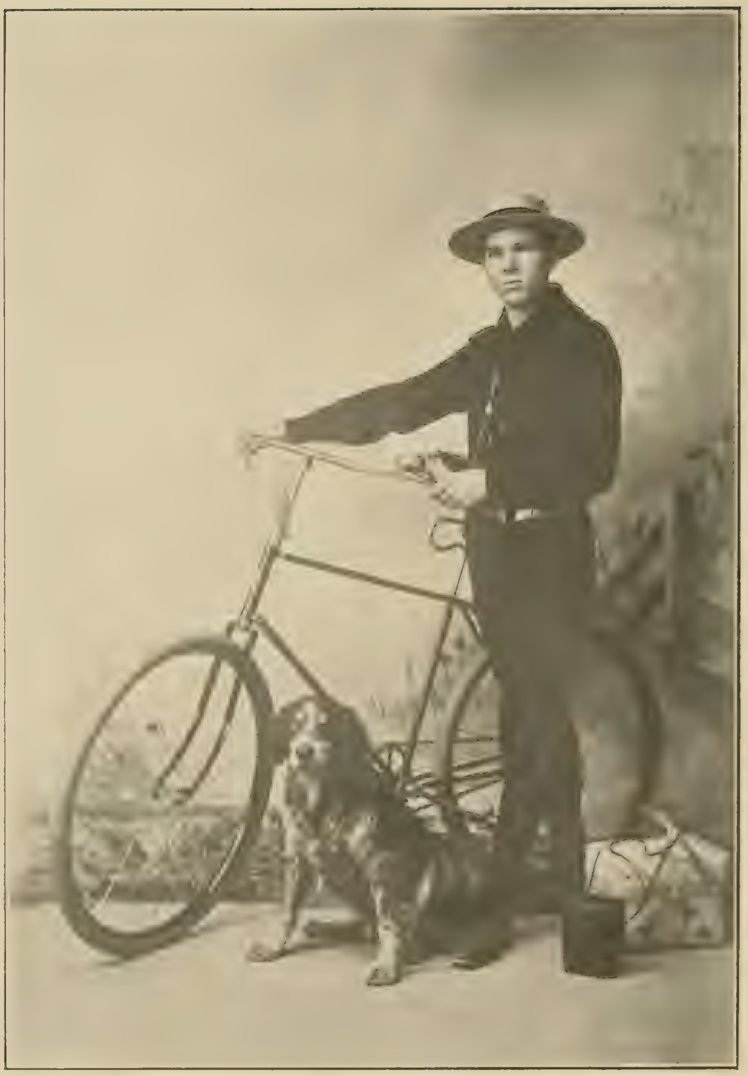


PHOTO BY HAWKINS 1895

THE OUTFIT

GLEANINGS IV.

SOME NOTES

ON THE SUMMER BIRDS

OF

MONONGALIA COUNTY, WEST VIRGINIA.

Observations Made Near
Blacksville and Morgantown and along
the Monongahela River.

By
J. WARREN JACOBS,
Waynesburg, Pa.

1905
Independent Printing Co.

GLEANINGS.

A series of pamphlets based chiefly on the Author's research in ornithology and oology and published from time to time as accumulating material and data permit.

GLEANINGS NO. I, 1898, OOLOGICAL ABNORMALITIES.

GLEANINGS NO. II, 1903, THE STORY OF A MARTIN COLONY.

GLEANINGS NO. III, 1904, THE HAUNTS OF THE GOLDEN-WINGED WARBLER. *35 c. per copy.*

GLEANINGS NO. IV, 1905, SOME NOTES ON THE SUMMER BIRDS OF MONONGALIA CO., W. VA.

15 cents per copy. For sale by the Author.

INTRODUCTION.

The present paper does not aim to set forth a complete list of the summer birds of Monongalia County, West Virginia; but to give brief notes on those observed by the Author at various points within the county.

The Author's original plan was to make several trips to different parts of the county for the purpose of recording notes on the birds found throughout the summer months. The first of these trips was made in 1895, when I investigated a small section south-west of Blacksville. Two years later I made a trip to Morgantown, going and returning by different routes. Here my investigations had to cease and I have been unable ever since to make further trips. For this reason, and to supply several inquiring friends with what little records I have of this virgin territory, I have decided to submit this little pamphlet.

It is with some hesitancy that I publish the half-tone plate of "the outfit" ready to start on a trip across the Mason and Dixon Line to pry into the Avifauna of our neighboring state. But it is in memory of the good old dog, who accompanied me on these trips, that the picture is used.

J. WARREN JACOBS.

Waynesburg, Pa.
February 15, 1905.

Some Notes on the Summer Birds of Monongalia Co., West Virginia.

In the spring of 1895, when I brought into use the bicycle, as a part of my outfit for bird study, I found it so convenient that I concluded to make several trips into West Virginia to record notes on the summer birds of Monongalia County, adjoining Greene County, Pennsylvania, on the south.

Business interests at home, however, intervened to prevent more than two of these trips and these for only a day at a time. Both trips were made to Blacksville, a little town just over the State line, fourteen miles south of Waynesburg, and the run south was made in the evenings.

On the afternoon of May 31, 1895, I prepared to make the first trip. At the suggestion of a member of the family, I allowed the picture of myself and outfit to be taken, and is presented here in memory of my brother's good old dog Fred, an English Setter, a faithful old friend, who accompanied me on many of my trips to the woods and fields, making his last trip in the Summer of 1897, a short time before he went the way of all worldly flesh. He was fourteen years old.

Leaving Waynesburg at 4:45 P. M., I arrived at the Strosnider House, the village inn of Blacksville, at 7:30, having stopped a few minutes at different points along the route to record notes and allow the old dog to rest.

Along the route, and before I reached the State line, I observed thirty-five species of birds. Twenty-three of these were seen in abundance as follows: Cardinal, Catbird, Bronzed Grackle, Song Sparrow, Towhee, Indigo Bunting, Belted Kingfisher, Yellow-billed and Black-billed Cuckoos, Yellow-breasted Chat, Blue-gray Gnatcatcher, American Robin, Northern Yellow-throat, Cliff, Bank and Barn Swallows, Warbling Vireo, Baltimore Oriole, Orchard Oriole, Green Heron, Wood Thrush and Field Sparrow.

Nine species were observed to be fairly common: Meadowlark, Kingbird, Red-eyed Vireo, Vesper Sparrow, Scarlet Tanager, Yellow Warbler, Killdeer, Spotted Sandpiper and Chimney Swift.

A single individual of each of the following three species were seen: Golden-winged Warbler, Bob-White and Bluebird.

These birds were all observed near the public road as I passed along, and owing to the rapid rate I was moving, no opportunity was afforded to look into distant timber for Crows, Hawks, etc., and no doubt certain species, such as Woodpeckers, Pewee, Chipping Sparrow, Wrens, Thrashers and others escaped notice, whose presence near the public road should be expected.

On the following morning,—June 1—I started afoot for the woods and fields south of the village, and during the day fifty-one species were observed, and the following records taken:

Butorides virescens GREEN HERON.

A few observed along the Dunkard.

Actitis maculara SPOTTED SANDPIPER.

Common; seen feeding on the sand bars in Dunkard Creek.

Colinus virginianus BOB-WHITE.

A few heard on the briery hillsides.

Bonasa umbellus RUFFED GROUSE.

Heard one drumming in a large woods.

Zenaidura macroura MOURNING DOVE.

Common.

Cathartes aura TURKEY VULTURE.

Bunch of three circling slowly overhead, going eastward along Dunkard Creek.

Falco sparverius SPARROW HAWK.

One heard.

Coccyzus americanus YELLOW-BILLED CUCKOO.

A few of this species as well as a like number of the next.

Coccyzus erythrophthalmus BLACK-BILLED CUCKOO.

Ceryle alcyon BELTED KINGFISHER.

Three seen along the Dunkard.

Dryobates villosus HAIRY WOODPECKER.

Noted old bird with brood from nest.

Ceophloeus pileatus abieticola NORTHERN PILEATED WOODPECKER

One heard in a large woods.

Trochilus colubris RUBY-THROATED HUMMINGBIRD.

Saw one gathering nest material from a white walnut tree, and another was observed about the flowers of a poplar.

Myiarchus crinitus CRESTED FLYCATCHER.

Frequently heard, but not often seen.

Sayornis phoebe PHOEBE-BIRD.

A few along the rocky ledges of the creek bank.

Empidonax virescens ACADIAN FLYCATCHER.

Abundant in the mixed woods on the steep bank of Dunkard Creek, and in the wooded ravines to the south.

Cyanocitta cristata BLUE JAY.

The harsh notes of this bird heard occasionally during the day.

Corvus brachyrhynchos CROW.

Several heard in the woods. Also young were heard.

Molothrus ater COWBIRD.

Common everywhere, seen on the wing.

Agelaius phoeniceus RED-WINGED BLACKBIRD.

Common in the meadows in the Dunkard Creek Valley.

Sturnella magna MEADOWLARK.

Common in the low meadows near Dunkard Creek, and in the grassy hill-side fields.

Icterus galbula BALTIMORE ORIOLE.

Common along the Dunkard.

Pooecetes gramineus VESPER SPARROW.

Seen and heard in the hill-side fields.

Spizella socialis CHIPPING SPARROW.

Common. A nest containing four half grown young foun
twelve feet up in an apple tree over a public road.

Spizella pusilla FIELD SPARROW.

Noted several nests.

Melospiza cinerea melodia SONG SPARROW.

Common, especially along the small brooklets in the fields.

Pipilo erythrophthalmus TOWHEE.

Noted in places frequented by the next species.

Cardinalis cardinalis CARDINAL GROSBEAK.

Common in the brier fields and the border of woods.

Cyanospiza cyanea INDIGO BUNTING.

Several noted. Saw nest containing three eggs.

Piranga erythromelas SCARLET TANAGER.

Common where timber was found.

Progne subis PURPLE MARTIN.

Colony nesting in a box over the sidewalk in Blacksville.

Riparia riparia BANK SWALLOW.

Several along the creek. A nest containing seven eggs found.

Vireo olivaceus RED-EYED VIREO.

Several observed in the steep wooded hill-side opposite Blacksville, and in other wooded tracts.

Vireo gilvus WARBLING VIREO.

Several heard in the sycamores along the Dunkard.

Mniotilta varia BLACK-AND-WHITE WARBLER.

Several noted. One pair with food for young was observed on the side of a broad ravine near the edge of a large forest.

Helmitheros vermivorus WORM-EATING WARBLER.

A nest containing four young about a week old, found under an oak root on upper side of wagon road in mixed wood on a hill-side.

Helminthophila chrysoptera GOLDEN-WINGED WARBLER.

Four heard in a large neglected field.

Compsothlypis americana usneae NORTHERN PARULA WARBLER.

A male seen in the mixed woods,—spruce, linden, buckeye, oak, etc.—on the steep bank of Dunkard Creek, opposite the village. While the bird appeared rather anxious, I spent but little time looking for a nest owing to it being very late in the afternoon, and time for me to be on my return trip home.

Dendroica aestiva YELLOW WARBLER.

Along the streams.

Seiurus aurocapillus GOLDEN-CROWNED THRUSH.

Several heard in the woods.

Seiurus motacilla LOUISIANA WATER-THRUSH.

Three observed.

Geothlypis formosa KENTUCKY WARBLER.

Eight birds seen. Also two nests observed,—one deserted and one just receiving the lining.

Icteria virens YELLOW-BREASTED CHAT.

Abundant; heard almost constantly. A nest with two young noted. Old bird was feeding the nestlings.

Setophaga ruticilla AMERICAN REDSTART.

A nest 28 feet up in top of slanting white walnut tree containing four eggs. Other individuals noted.

Galeoscoptes carolinensis CATBIRD.

Common. One nest observed containing three eggs, one of which was pipped.

Sitta carolinensis WHITE-BREASTED NUTHATCH.

Common; heard in the wooded tracts.

Baeolophus bicolor TUFTED TITMOUSE.

Common in the timber.

Parus atricapillus BLACK-CAPPED CHICKADEE.

Several noted.

Polioptila caerulea BLUE-GRAY GNATCATCHER.

Common in the woodland.

Hylocichla mustelina WOOD THRUSH.

Common in the woods. Saw a completed nest 12 feet up on a horizontal branch of buckeye tree. In another woods I picked up an adult bird partly devoured.

Merula migratoria ROBIN.

Continuously seen throughout the day.

The second trip to this section was made on the evening of June 19, more to ascertain if the Parula Warbler (C. americana usneae) bred in the region than to cover new territory. Accordingly my first place to visit the next morning, was wooded hill-side opposite the village where I had seen the male Parula on my previous visit. Approaching the clump of spruce and buckeyes, I was greeted with the notes of the bird, and at once began a search for its hidden nest, which I soon found well concealed among the twigs at the end of a drooping spruce branch, nine feet up and almost over the edge of the water in the creek. The composition was chiefly of fine grasses, with a slight mixture of usnea moss, vegetable fiber and small bits of wool. It contained the fragments of one egg, but in general appeared to have been used, as there was much excrement in the bottom.

About fifty yards from this site I came upon another pendant spruce branch having a suspicious looking ball near the end, which upon examination proved to be a newer nest of this warbler, but was deserted, having two addled eggs of the warbler and one of *Molothrus ater*. This nest was similar to the first, but contained a goodly supply of hickory catkins and hair, as well as some fine rootlets in the lining.

Going over a part of the ground I had previously visited, I found several nests of Acadian Flycatcher, which seems to be a late breeder here for all the eggs were fresh. One nest each of Yellow-billed Cuckoo and Field Sparrow, were found containing two and four young respectively. A Red-winged Blackbird's nest contained one egg, and an Ovebird was observed feeding her young. A mother Grouse with her brood was seen in the wooded hill-side, opposite Blacksville, and another in a woods a half mile west of the village.

A buggy trip to Morgantown, the seat of Monongalia County, on August 21, 1897, resulted in some observations of value in connection with those already mentioned. The public road I followed crossed the State line about five miles east of where the Blacksville records were taken, and extended in a southerly direction half way across the County.

A greater part of the road is over a very hilly country and through many tracts of woodland. Woodpeckers were met with in all these places, several individuals being in sight or hearing at all times.

After I entered Monongalia County the following birds were observed to be common:

Zenaidura macroura MOURNING DOVE.
Dryobates villosus HAIRY WOODPECKER.
Dryobates pubescens medianus DOWNY WOODPECKER.
Centurius carolinus RED-BELLIED WOODPECKER.
Melanerpes erythrocephalus RED-HEADED WOODPECKER.
Colaptes auratus luteus NORTHERN FLICKER.
Molothrus ater COWBIRD.
Agelaius phoeniceus RED-WINGED BLACKBIRD.
Quiscalus quiscula BRONZED GRACKLE.
Spizella socialis CHIPPING SPARROW.
Spizella pusilla FIELD SPARROW.
Melospiza cinerea melodia SONG SPARROW.
Progne subis PURPLE MARTIN.
Galeoscoptes carolinensis CATBIRD.
Thryothorus ludovicianus CAROLINA WREN.
Merula migratoria ROBIN.

Five Cardinals were seen; three Ruby-throated Hummingbirds, two Sparrow Hawks, two Blue Jays and one Green Heron.

A Carolina Wren's nest containing five fresh eggs was secreted among the rootlets overhanging the bank at the upper side of the road. The old bird was flushed from the nest.

An old nest of Louisiana Water-Thrush was noted tucked under some projecting moss and sod in the side of the road in a damp piece of woodland.

The next day, August 22, while on the street near the public square in Morgantown I saw a Pileated Woodpecker (*Ceophloeus pileatus abieticola*). crossing over the central part of the town, in the rear of the Court House. There was also a numbr of Purple Martins in the vicinity of the Court House; and I was told that a number of these birds had nested in the cornice of a building near the public square.

In the evenings, Nighthawks were seen in considerable numbers as the southern movement of these birds was on.

On the 23, I returned home by way of the road paralleling the Monongahela River, and owing to a constant drizzling rain but few records were taken.

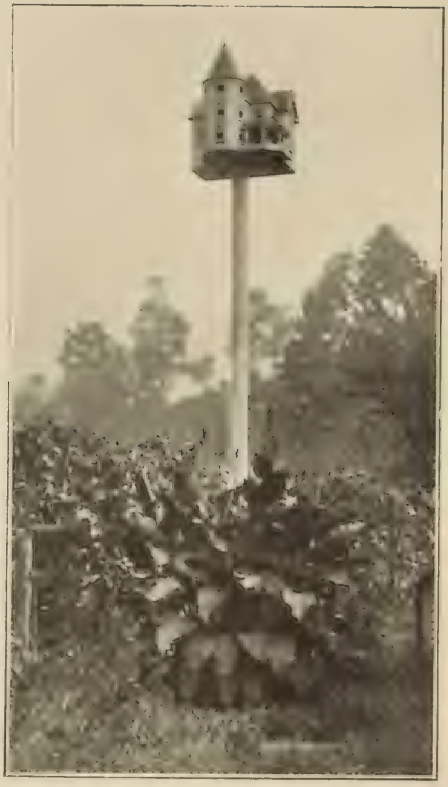
Migrant Shrike (*Lanius ludovicianus migrans.*) One seen on a telegraph wire. Barn and Cliff Swallows were seen in great numbers, one flock alone numbering about a thousand individuals.

GLEANINGS

Nº 5

The Purple Martin

AND HOUSES FOR ITS
SUMMER HOME



JACOBS PURPLE MARTIN COLONY

HOUSE NO. 2, IN POSITION

GLEANINGS NO. 5

THE PURPLE MARTIN

(*PROGNE SUBIS*)

and Houses for Its Summer Home.

ILLUSTRATED ARTICLES

—BY—

J. WARREN JACOBS.

REPRINTED FROM
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"BIRD LORE"
VOL. VII., NO. 1, ISSUED JAN.-FEB., 1905.

ADDITIONAL NOTES

FROM THE AUTHOR'S OBSERVATIONS.

CHAS. T. SUTTON, PRINTER
WAYNESBURG, PA., 1909

GLEANINGS.

A series of pamphlets based chiefly on the author's research in ornithology and oology and published from time to time as accumulating material and data permit.

Gleanings No. 1 (1898), **Oological Abnormalities.**

Gleanings No. 2 (1903), **The Story of a Martin Colony.**

Gleanings No. 3 (1904), **The Haunts of the Golden-winged Warbler.**

Gleanings No. 4 (1905), **Some Notes on the Summer Birds of Monongalia County, W. Va.**

Gleanings No. 5 (1909), **The Purple Martin and Houses for Its Summer Home.**

Prices: Nos. 1, 2, 3, $1 each per copy; No. 4, 25c; No. 5, $1 per copy. The five numbers $4.00. For sale by the Author.

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INTRODUCTION.

Since the publication of *"The Story of a Martin Colony"*, in 1903, by the present writer, as the second number of "Gleanings," he has been the recipient of hundreds of letters requesting further information on the habits of the Martins, their colonization, extension of their present communities, construction of houses and numerous kindred topics.

Hours have been spent in attention to this correspondence, cheerfully disseminating such knowledge at my command. Publishers of scientific journals have procured my assistance in giving to the Martin lovers, and bird students generally, much information to guide them in their efforts to cultivate an intimate acquaintance with these fine birds and induce them to build their nests and rear their young in miniature residences put up for their use.

Many persons have been successful and have written me of their pleasure in the presence of the birds, and the enchanting twitter of their song throughout the summer.

Three of these articles, written for the magazines, have been selected to enter into the compilation of this brochure, inasmuch as their character and scope cover, pretty thoroughly, the points and topics mostly inquired about by correspondents.

It seems desirable to bring together these articles for publication under one cover, for the following reasons:

First: the edition of Gleanings No. 2, "The Story of a Martin Colony", is now nearly exhausted.

Second: two of the published articles were printed in the Pennsylvania State Zoological Bulletin, a state publication and not readily obtainable to students residing outside of this Commonwealth.

Third: not the least important of these articles appeared in "Bird Lore" for Jan.—Feb. 1905, the issue now unobtainable at the office of publication.

Fourth: owing to the great demand upon my time in attending to correspondence relative to Martin colonization and the lengthy explanations and repetitions usually required in detailing the information sought, I have deemed it expedient to publish the articles in the present form.

The summer of 1908 being a very successful season with the Martins in and about Waynesburg, enabled me to add considerable to my experience and secure some additional photographs which will be found not the least attractive of the halftone reproductions embellishing this little pamphlet.

Some of my correspondents, whom I have endeavored to assist in establishing the birds have written me their experience, the substance of which I have incorporated in my additional notes which occupy the concluding pages of this booklet. The other pages are presented in the order of the date of original publication.

The plates are accompanied by proper explanations, and foot-notes and annotations are introduced when the same is thought desirable. Special attention should be called to these foot-notes and plate descriptions, some of which contain very important observations, enlarging upon the information contained in the main body of the text.

J. WARREN JACOBS.

Waynesburg, Pa.
January, 1, 1909.

*Notes on the Purple Martin (*PROGNE SUBIS*) and Bird Houses for Its Summer Home.

(Written for the Monthly Bulletin of the Division of Zoology, at the request of the Economic Zoologist.)

Away back in the seventies when we first came to Waynesburg, my father erected a bird house of sixteen rooms for the use of the Martins. At that time the English Sparrow was not known in this section and its depredations, therefore, were not thought of. However, another bird, one of beauty and courage, was already upon the scene and claimed nativity as his right to pre-empt the home of the Martins. This was the blue bird with his uniform of deep blue coat and reddish pantaloons. There was no compromise on his part; he wanted the whole box for his single nest. Selfish, stubborn and stingy, he would drive away half a dozen of his own kind after they had assisted in breaking the Martins' eggs, or in killing the young. At first my father had my older brothers shoot some of these birds, but it seemed that another was always ready to take the place of one killed.

Despairing of reducing the number of Bluebirds, my father ordered the shooting stopped. My brothers then caught the Bluebirds and pulled out their tail feathers, and thereafter whenever we saw a "bobtailed" Bluebird in our part of town we knew it was one that had visited our Martin house. Three years were spent in an effort to establish the Martins, but each spring the Bluebirds annoyed them so much that the Martins left. Finally my father took the box down. Nearly twenty years elapsed before I decided to try my luck in establishing a colony of these birds. During this time great changes were taking place about our premises. The town which was some blocks to the north of us, spread out until it encroached upon us and enveloped our property with the busy, noisy surroundings, and passing on, crossed the creek south of us and filled a part of a small valley with dwellings and steam works. The Bluebird became scarce, and in 1895, a March blizzard almost annihilated it. Ex-Sheriff Cosgray had about the time my father took down his Martin house, brought four of those unruly, selfish feathered foreigners—the English Sparrow—from New York city and turned them lose in the town, where in a very few years they increased into thousands.

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*Published February 1, 1904, in "The Monthly Bulletin of the Division of Zoology, Vol. I., No. 10," Issued by the Pennsylvania State Board of Agriculture, Harrisburg, Pa.—pages 27 to 30. Prof. H. A. Surface, Economic Zoologist. On a preceding page, under the head of "Our Monthly Chat with Readers," Prof. Surface calls attention to this article in the following note: "Especial attention should be called to the article on 'Notes on the Purple Martin and Bird Houses for its Summer Home,' which is written especially for this bulletin, without charge, by Mr. J. Warren Jacobs, Waynesburg, Pa. Mr. Jacobs has not only prepared this valuable and timely article, but has also loaned to the State, free of charge, for use in this Bulletin, his excellent plates from which the illustrations were made for his very interesting and unequalled booklet entitled 'The Story of a Martin Colony'."

I had long desired to have a few Martins nest on our premises, but was discouraged from putting up a box because of depredations by the Sparrows, which were plainly evident at bird-houses in other parts of town.

At last, in the spring of 1896, I decided to erect a box for the Martins and at the same time oust the Sparrows which nested about our buildings which might drive away the former. This bird-house, in which was laid the foundation for a large colony of Martins, was a four gabled structure of twenty rooms, a central cupola on top and a chimney on each gable. It was erected thirteen feet high, about eighty feet south of where my father's box had stood years before. Eleven young birds were reared in this box that year, and in the third year another house was erected to meet the demand for nesting room and the next year still another box was put up making a total of ninety-nine rooms, and the colony continued to increase. A happy result since that year is that there is an

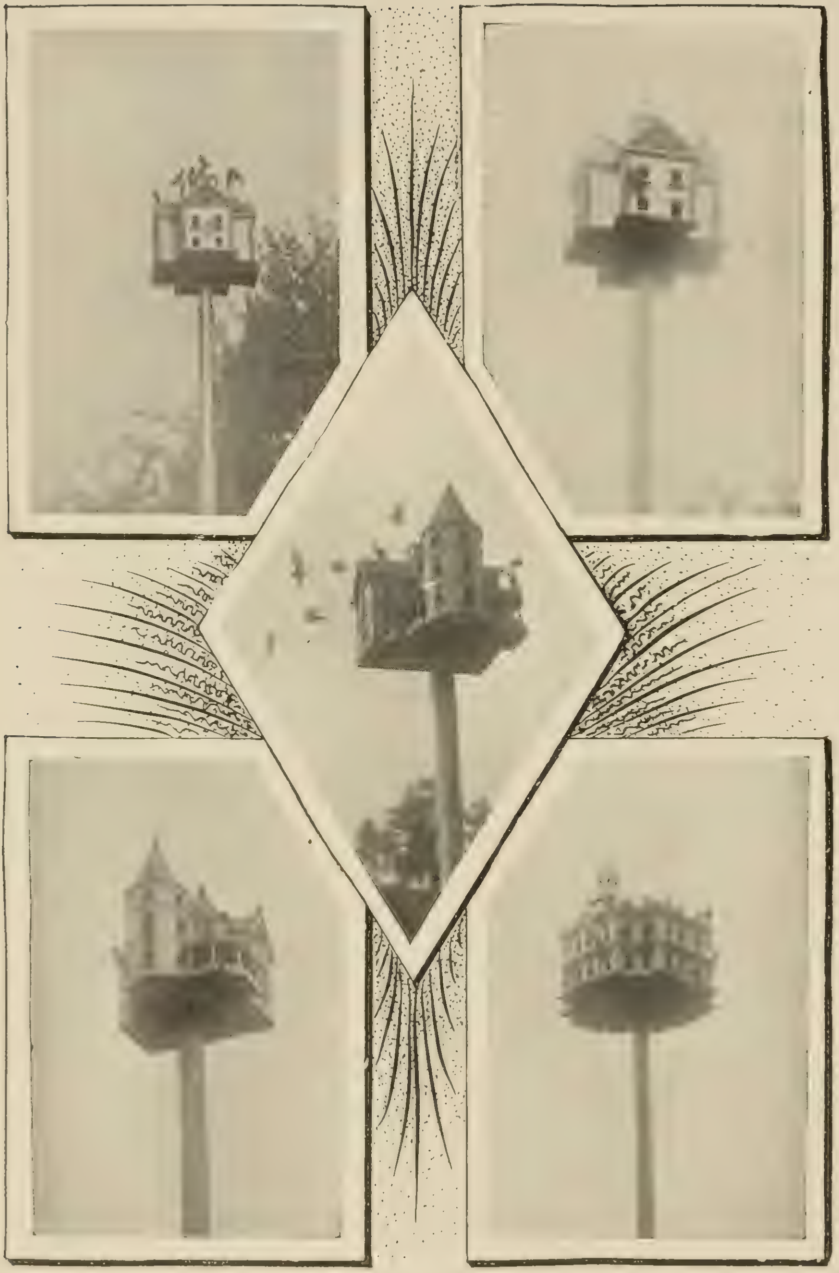

PLATE II.

HOUSES NOS. 1, 2 AND 3 OF THE JACOBS MARTIN COLONY, FROM PHOTOS BY THE AUTHOR DURING JULY, 1900.

The two upper pictures were taken while the birds were collecting on house No. 1. The central picture is from a snapshot as the birds took flight from the house, and the lower views were taken while a number of birds were resting on houses 2 and 3.

This plate was originally used in "The Story of a Martin Colony"; and in the January-February, 1903, issue of "Bird Lore", Mr. Chapman used it in his review of this booklet. It was also used to illustrate the Author's two articles written for the Pennsylvania State Zoological Bulletin.

annual overflow of birds from my colony which go elsewhere to nest.

In 1903 nearly eighty pairs nested, notwithstanding a period of cold, rainy weather the previous year killed about half the young. A similar fate befell them again last season, but it occurred at hatching time and most of the birds rebuilt immediately and reared late broods.

To secure a good colony of Martins it is necessary to guard against certain enemies, chief among which, at the present day, is the English Sparrow. These birds kill the young Martins and throw them out, and will also carry out the eggs and drop them, and in a short time will render the rooms of the bird-house untenable for the Martins by carrying in the nesting material and packing it so tightly that hard pulling with an iron hook is required to dislodge it. The makeup of a Martin's nest is so different from that of a Sparrow's that it cannot use a room in which the latter has nested. For shooting the pests I use a 22 calibre rifle and long shells loaded with dust shot which is effective up to 50 or 60 feet.

Another enemy of the Martin is the domestic cat. Watch her, for when the male Martins get to fighting they nearly always fall to the ground where "tabby" is lying in wait. The sooner you can telescope the lurking cat with a solid shot the better your Martin colony will thrive. I have been obliged to kill cats on three occasions for killing my Martins, and a neighbor informed me that a cat had captured two of his four nesting males at one strike. Along with the cat, the owner of a colony of Martins must keep his eye on men and boys who run about shooting birds. He cannot use the shot gun on these, but there is a state law which will reach them, and its enforcement once will have a wholesome effect on other shooters. The Bluebird is no longer a very great enemy, although I know of two or three instances, during the past summer, where they bothered the Martins. A pair of Bluebirds nested in small boxes I put up for them, within fifty feet of my Martin houses, the past year, raising two broods, but never did I see them approach the Martin houses or fight their owners.

To entice the Bluebird to remain on the premises without molesting the Martins, make a nesting box about five inches square (inside) and eighteen inches high; cut a round hole two and three-fourths inches in diameter in the front near the top; put on a sloping roof and add a perch on top, place it seven to ten feet above the ground on top of a stout pole or on a vine arbor just out of reach of the vines. A Bluebird box should be put up not later than March.

To have a neat serviceable Martin house it is necessary to spend but a few dollars, which is returned many times over in the beauty and cheer thrown around your home by the presence and jubilant song of these charming birds.

*Two or three dollars will pay for the materials for a plain box of ten or twelve rooms, and few tools are necessary for its construction. Larger and more elaborate houses, of course, run into money. One of mine, a sixty-six room structure put up last year is worth $40.00, while the one in two of the accompanying cuts numbered 3, is worth $25.00, the materials and pipe upon which it is erected costing $15.00. There are forty-five rooms in this house. House numbered 2, in the engravings, would cost when completed, with pole, $18.00, and thirty-four nesting rooms would be presented to the Martins. A box similar to the four gabled structure, represented as No. 1, in two of the cuts, costs when complete about $12.00, the pipe costing a little less than half this amount.

In constructing a Martin house, care should be taken to have all partitions tight, so that all light is excluded except what streams through the entrances to the rooms. The size of the rooms should not be less than five inches square and six inches high, and should not be much larger than six inches square and seven inches high.

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* It must be understood that the prices and methods of construction contained in this and other articles reprinted in this booklet are to aid one in building his own bird house, on the cheapest possible plan, and are not followed by the Bird House Company under the control of the author of this booklet.

Entrances to the rooms in all my houses are of two uniform sizes; two and one-fourth inches square for windows and two and one-half inches in diameter where a round entrance is made. In imitating a miniature residence the square represent the lower half of windows, and round openings are entrances to gable attic rooms. A wide perch for entrance is the most convenient for the birds, but it mars the beauty of a fancy house, and a small piece representing a window sill is substituted, made of three-fourth inch thickness, poplar, which is sufficient for the birds to cling to.

Two or three story houses are very attractive, and the whole should be well painted and joints in the roof covered with tin to keep out the water. Clean poplar lumber three-fourths or seven-eighths inch thick is most durable for exposed parts, while the bottom should be of oak, and in large heavy boxes, doubled. A straight wooden pole is least expensive, but an iron pipe is best in the long run, and a two-inch one is sufficiently strong to hold an average sized box. Erect the box twelve to fifteen feet high.* Expensive boxes should be provided with a large, heavy iron hinge near the base of the pole, for lowering and placing it in the dry during the seven months the Martins are on their southern sojourn. To provide for this arrangement, box two feet of the lower end of the pipe to a diameter of ten or twelve inches, and hinge to the end of a square piece of oak three and one-half feet long to be placed in the ground for a base.

Where the birds are established they return late in March or early April, but a new house may remain unoccupied until early May. It is best, however, to erect the box on or before April first.

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*Twelve feet high will not insure the birds in a very public place, or where children play on the lawn surrounding the bird-house. I now place all my houses, and those I build for other Martin-lovers, fifteen or more feet above the ground.

December, 1908.

PLATE III.

COMING HOME AT EVENTIDE.

(From "The Story of a Martin Colony.")

From photos of houses Nos. 2 and 3 of the Jacobs Martin Colony; taken by the Author, about 8 o'clock p. m., July 9 and 18, 1900, respectively.

This plate was used in illustrating the writer's two articles written for the Pennsylvania State Zoological Bulletin, reproduced in this pamphlet.

*On the Construction of Houses for the Purple Martin.

It is a task for me to give plans and describe the manner of constructing houses for Purple Martins. This is not because I have lacked experience in building these houses, but because in making a score or more of Martin homes I have followed no set plan or rule, except to have the rooms a certain size, the entrances to the same of proper dimensions, and the whole, when finished, to have the appearance of a miniature residence or other building.

Before commencing a bird-house, I had firmly fixed in my mind about what I wanted to do, and could fairly well picture how the house would look when completed. With my head for a guide, and a well-equipped kit of wood-working tools, I went to work on a house, which, when completed, was a well- proportioned, miniature building, bearing close inspection by architectural critics.

The first Martin house I built contained rooms 6 inches square and 7 inches high, with entrances 2¼ inches square 1 inch above the floor. The birds were so well pleased with this box that I have followed this rule in making all others. Of course, the model of some of the houses I have made compelled me to vary in the dimensions of some of the rooms, but in nearly all cases the capacity was about the same:—if the width of a room was an inch less than the regular size the depth was greater.

If you wish to build a Martin house and are fearful that you cannot devise and carry out a neat, well proportioned, miniature residence, make a plain box of twelve rooms, paint it

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*Published in "Bird Lore" for January-February, 1905; Vol. VII, No.1. The plates used in illustrating the article were made from drawings and photos furnished by the Author. The editor, Mr. Frank M. Chapman, very kindly presented the plates to the Author with "Bird Lore's" compliments.

Fig. 1

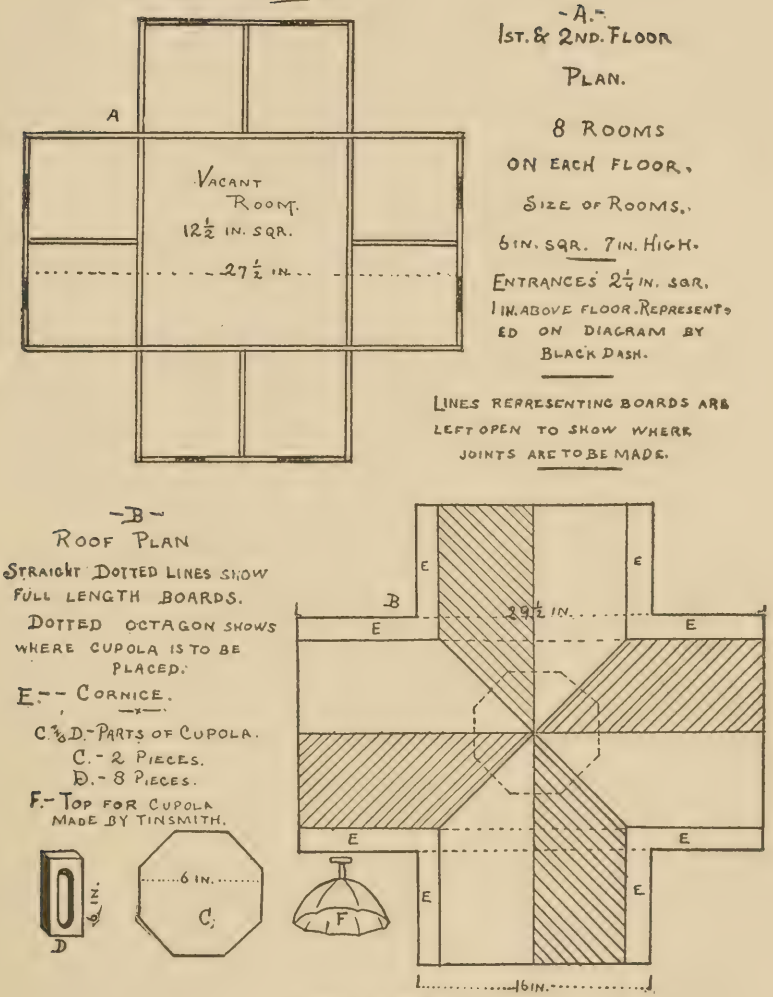
-A.-
1st. & 2nd. Floor Plan.
8 Rooms on each floor.
Size of Rooms. 6 in. sqr. 7 in. High.
Entrances 2¼ in. sqr. 1 in. above floor. Represented on diagram by black dash.
Lines representing boards are left open to show where joints are to be made.
A
Vacant Room. 12½ in. sqr.
27½ in.
-B-
Roof Plan
Straight dotted lines show full length boards.
Dotted octagon shows where cupola is to be placed.
E.-- Cornice.
C. & D.-Parts of Cupola.
C.- 2 Pieces.
D.- 8 Pieces.
F.-Top for Cupola made by tinsmith.
B
29½ in.
E
16 in.
6 in.
C
D
2 in.
F

PLATE IV.

Floor and roof plan of house No. 1. From a drawing by J. Warren Jacobs, illustrating his article "On the Construction of Houses for the Purple Martin," written for "Bird Lore," Vol. VII., No. 1, 1905.

well and erect it 12 to 15 feet above the ground, on a stout pole or iron pipe, in a position twenty or more feet from your buildings and where the tree branches do not reach. To make such a box, take a board 13 inches wide and 20 inches long ;this is for the bottom or first floor, and should be at least ⅞ inch thick. For sides and ends use a poplar board 16 inches wide and ¾ inch thick. Cut off two 13-inch sections for the ends, and two pieces 21½ inches long for the sides. With a rule and pencil, divide these two side pieces off in three equal sections each; then draw a line full length the board, through the middle; make an opening 2¼ inches square, centrally in each of the six sections, 2 inches from the bottom edge, for the first story, and 1½ inches above the middle line for the second story. This gives openings for six nesting rooms in each of the two sides. Now nail the end pieces to the bottom board, and then add the side pieces, and the box is ready to receive the partitions, second floor and top ceiling—all of which can be made of pine box-stuff ½ inch thick. This completes the inside up to the 'square.' Now cut four triangular pieces for gables and roof supports, nailing two of them on top of the end pieces and two directly over the partitions. This leaves a space in each gable end which can be utilized by the birds if a round hole 2½ inches in diameter is cut for an entrance. Nail the roof boards on, leaving the eaves and ends to project about an inch, put a perch beneath each opening, or a strip 1½ inches wide full length of the box beneath each row of doors. Add ornaments on each end of roof, and a little piece of wood representing a chimney in the middle. Paint the body of the box white and the roof a slate color. Four short angle-irons, with holes for screws or nails, and made of old buggy tire at the blacksmith shop will serve as the safest means of fastening the box to the pole. Wooden braces or supports of any kind reaching from the pole to the edge of the box should be avoided, if you wish to deprive your neighbors' cats of an occasional feast on Martin flesh. The tools necessary for constructing this box are ordinary carpenters' saw and hammer, a brace and ¾ inch bit for

PLATE V.

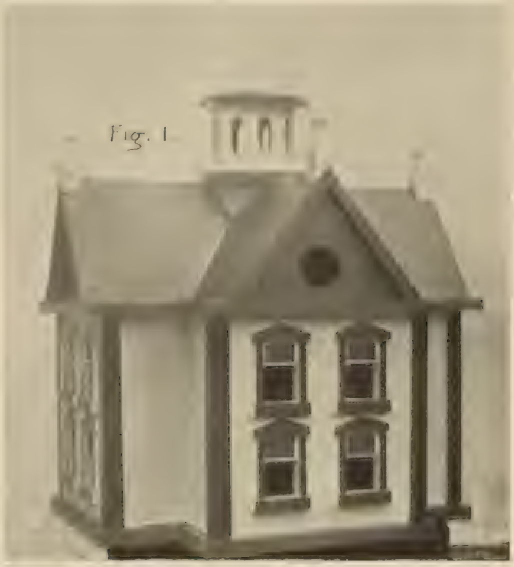

FIGURE 1.
Jacobs
Martin House
Style No. 1

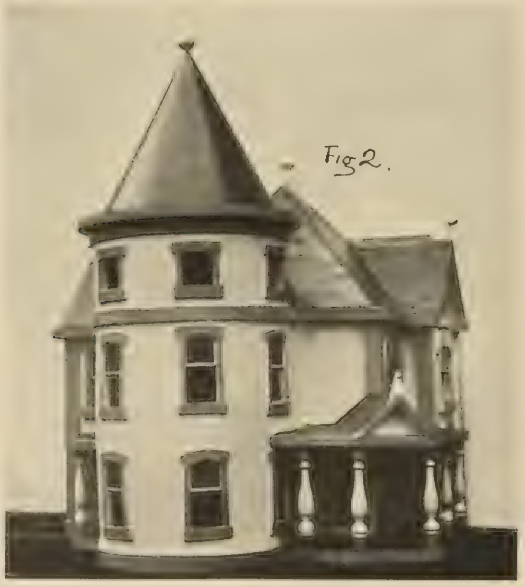

FIGURE 2
Jacobs
Martin House
Style No. 2

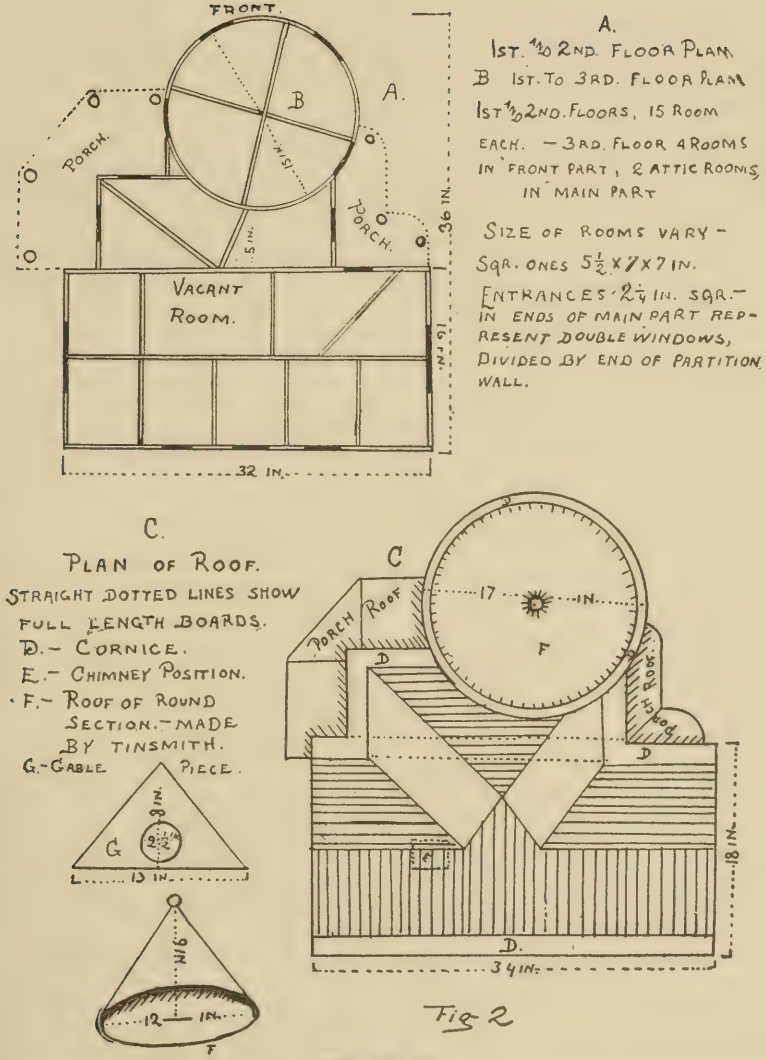
FRONT.
B
A.
PORCH.
PORCH.
15 IN.
5 IN.
36 IN.
16 IN.
VACANT ROOM.
32 IN.
A.
1ST. TO 2ND. FLOOR PLAN
B 1ST. TO 3RD. FLOOR PLAN
1ST TO 2ND. FLOORS, 15 ROOM EACH. — 3RD. FLOOR 4 ROOMS IN FRONT PART, 2 ATTIC ROOMS IN MAIN PART
SIZE OF ROOMS VARY — SQR. ONES 5½ X 7 X 7 IN.
ENTRANCES 2¼ IN. SQR. — IN ENDS OF MAIN PART REPRESENT DOUBLE WINDOWS, DIVIDED BY END OF PARTITION WALL.
C.
PLAN OF ROOF.
STRAIGHT DOTTED LINES SHOW FULL LENGTH BOARDS.
D.— CORNICE.
E.— CHIMNEY POSITION.
F.— ROOF OF ROUND SECTION.— MADE BY TINSMITH.
G.— GABLE PIECE.
8 IN.
2½"
G
13 IN.
9 IN.
12 IN.
F
C
PORCH ROOF
17 IN.
F
D
D
PORCH ROOF
D
E
18 IN.
D.
34 IN.
Fig 2

PLATE VI.

Floor and roof plan of house No. 2. From a drawing by J. Warren Jacobs, illustrating his article "On the Construction of Houses for the Purple Martin," written for "Bird Lore," Vol. VII., No. 1, 1905.

starting the openings to the rooms, and a compass-saw for enlarging and squaring the same. For constructing more elaborate bird-houses, other wood-working tools will be needed and a work-bench with a strong vise is desirable.

Two designs are selected from photographs of bird-houses I have built, and the floor and roof plans are given to aid those who wish to build elaborate houses. To go into detail and describe these plans would take up much valuable space, and be so tedious to follow that many persons would become confused and discouraged at the beginning; therefore, I give a brief description here, and add figures, measurements and explanations to the plans as a further help.

The principal points are to get the rooms a suitable size, and the openings rightly placed and of the proper dimensions.

Fig. 1 is a four-gabled structure of twenty rooms: the height from bottom board to cornice is 16 inches, and the width of each front is 14 inches; the little gable pieces, in which the round openings are cut, are 8 inches; The cupola is 6 inches high, exclusive of the two octagon pieces, which are of ⅞-inches in diameter; on top of this is the little dome-shaped roof made by a tinsmith. The size of all the rooms on the first and second floors is 6 inches square and 7 inches high—four rooms on each side of a hollow space 12½ inches square. Little roof ornaments for the birds to perch on are whittled out of white pine blocks, and the corner strips and window-frames and caps are made of thin pine strips. The window-sills are ½ to ¾ inch thick, which give the birds a foothold in going in and out of their nesting-rooms.

The same material used in No. 1 will answer in building No. 2, with the addition of round wooden cylinders (I use "E Twist" tobacco crates, which are very convenient and cost but a trifle; they are about the size of a half-bushel measure, and parts of three are required in making this house). The rooms in the third story of this round part are only 5 inches high. Porch columns can be turned out of poplar pieces at the planing mill, or square ones, made by hand, with beveled corners, look well and cost less.

The outside of all joints, gutters and valleys in the roof should have a strip of tin securely nailed on to exclude water and preserve the house.

The first floor of all bird-houses weighing fifty pounds or over should be double, one extending above (inside), and one below the weather-boarding. Use ⅞-inch oak boards for the first floor; clean poplar, ¾-inch thick for the sides and roof, and white pine, ½ inch thick, for partitions and inside floors (shoe boxes are the best for this).

I paint the body of all my bird-houses white, and the corner strips, window-frames and other trimmings in light or dark green, red or slate, and chimney and roof ornaments white. Upper half of windows are painted green, to repre-

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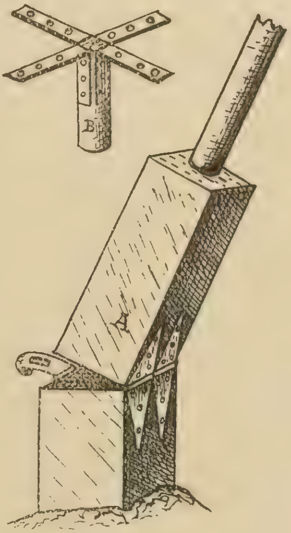

*The accompanying cut shows how the hinged pole and angle-iron attachment are now made by the Jacobs Bird House Company.

"A" Wood-casing surrounding the lower end of a four-inch steel boiler tube, 14 to 16 feet long, showing how it is hinged by means of heavy strap hinges, to a solid 8-inch square ground base, 4 feet long, which is to be placed in the ground to a depth of three feet or more. On the opposite side from the pair of strong hinges is an equally strong hasp for securely locking the pole in position.

"B" shows how the four angle irons,—which are to be screwed securely to the bottom of the bird house—are attached to a wooden block which slips down into the steel tube. A bolt holds this block in position and keeps the bird house firm.

December, 1908.

sent shades. Bottom of box and the pole are painted black.

The angle-irons, four in number, for fastening the box to the top end of the pole, are made of old buggy or wagon tire, according to the weight they have to support, and are screwed to the bottom of the box and to the pole; or if an iron pipe is used, to a piece of wood which will slip down into the end of the pipe. All expensive Martin houses should be erected on a pole provided with a pair of barn-door hinges and a clasp for locking securely in position, and for lowering the same and placing in the dry during the winter. This is done by casing 2 feet of the lower end of the pipe in a box made of 2-inch joists, and hinging it to the top end of a solid piece of oak or locust, 7 to 10 inches square and 3 feet long, placed in the ground to the depth of 2½ feet. (See illustration and foot-note, page 17).

*Something about the Purple Martin.

[*Progne Subis.*]

On August 17th last I read in a Pittsburg (Pa.) daily, a dispatch from New Martinsville, West Virginia, stating that thousands of "wall martins" or "swallows" came into the town to roost on the telephone wires and so great was the weight thrown on the wires that the telephone company became alarmed lest the increasing flocks break down their wire service.

These birds were on their way to the South (West Indies, Central and South America) where they remain during our autumn and winter.

Suspecting the birds to be the Purple House Martin, and being desirous of settling this point and facts as to the number of birds, I wrote my friend and former fellow townsman, Frank V. Iams, attorney, now residing in the West

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*Published February 1, 1908, in "The Zoological Bulletin of the Division of Zoology of the Pennsylvania Department of Agriculture," Vol. V., No. 10, Harrisburg, Pa.,—pages 312 to 317. Prof. H. A. Surface, Economic Zoologist. Preceding the article, Prof. Surface presents the following comment:

"We take pleasure in presenting to the public an article on the Purple Martin, written at our request, expressly for this Bulletin, by Mr. J. Warren Jacobs, of Waynesburg, Pa., who has had more practical experience in colonizing these birds around his premises than any other person in this State. We would call special attention to this article, as the manner of writing is straightforward, and every sentence shows that it is based upon a definite practical knowledge of the subject.

* * *

"We know from observation that Martins occasionally do fly in small groups over the State, even in counties remote from anywhere they have nested in boxes, apparently seeking suitable nesting sites. We have frequently known of their nesting beneath the hoods of electric lamps, and in the borough of Mechanicsburg, Pa., we have seen them nesting on a flat board beneath the roof of an awning over the street. At Glenn's Falls, N. Y., we saw large insects, such as Dragon Flies, that had been killed by Purple Martins, and carried to their nests for their young, but dropped beneath their boxes because the insects were too large to be eaten by the young birds."

Virginia city. In reply Mr. Iams corroborated the published dispatch, except that the telephone company, owning the wires, had not yet deemed it necessary to molest the birds. The birds, he said were "all House Martins, such as nest in boxes put up for their use." He further stated that the published statement that there were ten thousand of the birds, far underestimated the number, for he could sit at his own home and see more than that number; and the lines stretched out of sight of his residence.

On Sept. 7th Mr. Iams was in Waynesburg, and I had a further interesting talk with him about the gathering of Martins. After replying to my letter he gave the birds further attention and found they continued to increase in numbers until, he thinks, there were nearly 25,000, if this estimate is not inadequate. After the 28th of August they began to diminish in numbers until, when he last saw them, Sept. 5, only about one-fourth remained.

The birds came into the town in large streams or "string-flocks" from all directions. Those coming down the Ohio River, and those coming up the stream, being the largest. At some parts the flocks were over a hundred feet wide. They seemed to come to the town by way of near-by valleys. Besides the large flocks already mentioned, unusually large assemblies came down the Fishing and Doolin Valleys, and from the valleys coming into the Ohio from the opposite side of the river. When the birds reached the town, which was at about dusk, they would circle around before settling on the wires.

From the foregoing it would seem that our beloved House Martin is in no immediate danger of extinction, notwithstanding bad weather conditions, during the past four years, have affected them, at nesting time, all over Eastern United States, and in some sections, especially the New England States, where they once thrived, they are now almost extinct.

My own colony, which increased steadily from 1896, until about eighty pairs nested in 1904, and which is provided with the best accommodations, and afforded the best protection from persecutions by man, cats and sparrows, has been reduced one-half, on two occasions by disastrous weather conditions. In 1905 nearly 100 pairs had collected at my bird houses. Several pairs went elsewhere at nest-building time, and cold, damp weather at frequent intervals so interrupted and retarded the remaining birds in their work of nest-building that their numbers continued to decrease until barely 40 broods were raised.

Very much the same fate befell them in 1906, but there were on July 8 twenty-three occupied nests in houses No. 3 and No. 4. All young which hatched at my colonies, and at all others in and near this town, that year, thrived well, and a good increase over the previous year was noticeable.

In the latter half of March, 1907, this section experienced unusually fine warm spring weather which brought many Martins to the various bird houses in other parts of town. The first one arrived at my premises April 3, and this one was killed by the unprecedented April freeze, which continued unceasingly until about the 19th of the month. During this period, all the Martins—at least a hundred, which had arrived in this locality, perished from cold and starvation. It was about the last of April before the Martins again began to arrive. After May first they had a fair season, and success with their broods, but the annual production did not show an increase over the previous year.

With the coming of spring these birds will again be moving north to their nesting boxes, and with fair weather and no mishaps, this year will see an increase in the nesting pairs.

Food. The Purple Martin is one of the most beneficial of birds, living entirely upon winged insects; thousands of these pests are captured daily, in the vicinity of a thriving colony, for the menu of each brood. The further fact that the young remain in the nest rooms about four weeks, to be fed by their parents, increases this bird's value as an insect destroyer.

In cleaning my bird houses, after the broods have departed, I have examined the contents of the debris left behind, and find from a fourth to a whole pint of remains of insects, undigested. A predominance in this dirt is the hard wing-shell or case of a small black beetle we see in the air in the morning and evening, and sometimes throughout the day. In a teaspoonful of this dirt there are from 200 to 500 of these little wing coverings, and these, too, form only a small part of the debris left in the nest room—the bulk being undeterminable, and on the whole represents only a portion of the excrement of the young, much of it being carried away by the parent birds.

It is just such insects as these that the birds are capturing when we see them soaring, wheeling, darting and gliding to and fro, high in the air. They spend about sixteen hours, every day, in search of food. It undoubtedly requires hundreds of thousands—if not millions—of insects to feed an ordinary brood of Martins and sustain them and their parents until the time arrives late in August, for them to take their departure.

Think of what this means to a community, and pause to realize the service rendered mankind by only one species of insectivorous birds.

In the summer of 1907, there were nesting in and around the town of Waynesburg, between 200 and 250 pairs of Purple Martins. The writer made several visits to the various colonies and found fair sized broods flourishing. Three or four seemed to be the rule. Now here was about 800 young, which hatched between June first and fifteenth, and remained with us until after the middle of August—over two months—and between 400 and 500 parent birds which remained nearly five months; in all over 1,200 insect-hunters, to live and thrive on these most destructive pests. To express the number of insects consumed by the Waynesburg colonies alone would demand a long line of figures; and from what I am led to believe, after years of observation and examination of the debris from the nest rooms, it would require the filling of a bushel measure, at least a few times, to meet the demand of a season's nesting at my own colonies.

***Distribution.** There are only a few sections of Pennsylvania where the Martin cannot thrive—I refer to the higher mountain ranges. The bird really belongs to, or is most abundant in the Carolinian Life Zone, sections of which touch our State on the southeastern and southwestern corners, but it is also adapted to and is common in the Transition or Alleghenian Life Zone, which covers most of this Commonwealth. The higher mountain ranges are in the lower Canadian Life Zone of the Boreal Region, and out of the common range of the Purple Martin.

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*The range of the martins extends through the whole of Temperate and Tropical America, including the West Indies. Originally these birds nested in hollow trees—and possibly also in nooks and chinks about cliffs—but in more modern times some of the species have evolved from their primitive method to artificial nesting-boxes supplied by mankind, and adorning the premises near his habitation. The eggs of all the species of this genus are pure white.

In the United States and Southern Canada, one species—Purple Martin *(Progne subis)*—is generally distributed in the East, and the geographical variation, Western Martin (*Progne subis hesperia*) west of the Rockies. The latter variety, however, has not progressed far from the original instinct of nesting in hollow trees. A few have been recorded as nesting about buildings, old missions and chapels.

We now narrow down to the typical species—PURPLE MARTIN— inhabiting eastern United States and Canada.

SUMMER RANGE. BREEDING SEASON.—Temperate North America, except the Pacific Coast, breeding abundantly throughout all the country north to Maine, west through southern Ontario to Montana. North of this line which is about 45° N. Lat. in the East and 48° N. Lat. in the West, it rapidly grows scarce; breeding records more or less regular have been reported from Nova Scotia, New Brunswick, north-west Ontario, Manitoba and Saskatchewan. Few records as far west as Utah and fewer from Idaho appear, but the species is quite rare west of eastern Wyoming and eastern Colorado, except in very restricted localities not affected by the mountainous region. Southward its breeding range extends into the table lands of Mexico.

WINTER RANGE:—Mexico and West Indies to Venezuela and Brazil and rarely straggling southward. This species does not breed anywhere within the limits of its winter range.

MIGRATION:—In all the region within the boundaries described these birds wander from their chosen breeding grounds to and from their winter retreats under the tropical sun. During this semi-annual migration, individuals may be attracted to suitable boxes put up for their use in sections of country where they are not now encouraged.

December, 1908.

There may be wide expanse of territory, well adapted to the Martin's habits, in which it does not breed, because no inducements have been advanced for its consideration, or if such have been offered in suitable localities and not accepted by the birds, it is probably because the new house was far from any breeding colony, where there is an annual overflow of young birds to seek new quarters upon their return from the South.

Habits. The Martins, both old and young, return to the house of their nativity as long as it will accommodate them. When the young, of the previous year, return in such force as to overcrowd the old home, they are fought out by those already in possession, and retreat to new quarters, which will be selected near the old home if such exist. Therefore, the hope of establishing a new colony, depends, chiefly, upon an overflow, or a supply of surplus young birds from a neighboring colony, or discontented adults from neglected or dilapidated bird boxes. I know of colonies in this county which are five miles apart. It would be an easy matter for residents living between these points to establish colonies, and many times this distance from any known colony should be no discouragement to the person who is willing to make an effort to establish the birds.

These birds travel over wide expanse in quest of food. I have followed my birds three miles from their home boxes when they were procuring food for their young; and during their summer stay in this region, they, no doubt, roam over the whole county.

Where the country is of similar nature in climate and is not traversed by mountains of high altitude, I am of the opinion that new colonies may be started within a radius of twenty-five miles from a well established colony, especially if there be an overflow or surplus of young birds, or if the original boxes be allowed to become dilapidated, or the colony be neglected by allowing the Sparrows to fill the nest rooms with rubbish.

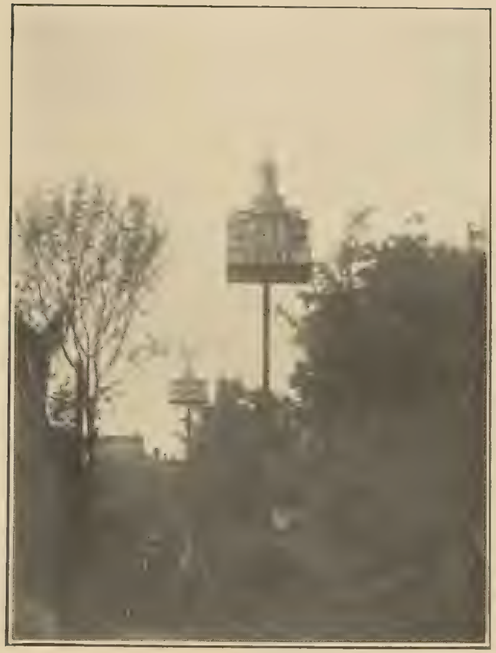

PLATE VII.

JACOBS PURPLE MARTIN COLONY

HOUSES NOS. 3 AND 4 IN POSITION, SHOWING THEIR SURROUNDINGS, FROM A PHOTOGRAPH BY THE AUTHOR, JUNE 15, 1907.

Martin Houses. In the February, 1904, issue of "The Monthly Bulletin of the Division of Zoology", I gave an extended article on the construction of bird houses for the Martins, and will here state briefly that the compartments should be 6x6x6 inches square, or a little larger,—not over 6x8x7 inches. For each room, there should be only one opening, 2¼ inches square, on a level with the floor or one inch above it, and a small perch at the bottom of each entrance. The house should be well painted (I paint all my boxes white, with colored trimmings), and joints in the roof should be tinned to keep out the rain. A few dollars will pay for all materials for a neat, serviceable box with several rooms, which can be constructed during idle hours, and the result enjoyed throughout the summer.

The height of the house above the ground should be between twelve and fifteen feet in quiet premises; and higher, if in a very public place, or where children use the lawn for a play ground. When I first established my Martin colony I had no children, but since that event I have been blessed with a small "colony" of my own kind, who romp and play over the lawn which encircles bird house No. 3. This box used to be a favorite with the birds, but I noticed a decrease in the number of its occupants, especially in the years when the birds were reduced by the elements, leaving surplus rooms in the other houses. Those remaining seemed more timid than formerly, and as I had made a two-foot fill in this part of the lawn, I concluded the bird box should be higher. Accordingly, last spring, I raised it to 16½ feet above the ground, and it was better patronized by the birds.

My friend, Mr. J. M. Walker, of New Bethlehem, Pa., has sent me a photograph of his bird home, which was well patronized by the Martins the past season. It consists of a cluster of four boxes surrounding the top of a 50-foot pole, with a roosting shed eight feet long above them. Under the protecting roof of this shed, the old birds gather their broods to spend the night, after they are strong enough to leave their respective nest rooms. He writes me that his birds had a very successful year in their remarkably high aerial castle.

After your efforts to establish these birds once result in success, you are assured of their continued return each year, as long as you give them proper attention and protection, and as long as the birds do not meet death in some way.

How to Get the Birds.

That is the question. You must first build your bird house and experiment by erecting it in a conspicuous place, and wait for the birds. Keep out the sparrows, and if no Martins come the first year, try a second or a third time. In new territory the box should be up early in April, to attract passing migrants, but near old colonies, the latter part of that month is soon enough to put up a box.

If you are interested, it is well worth an effort to try to establish the birds, and a man or boy with two good eyes and strong, active arms, has plenty of leisure time to build a bird house. My friend, Mr. John T. Timmons, of Cadiz, Ohio, is blind, but he built an elaborate bird-house for his residence grounds, that he might hear these fine birds, although he could not see them. He was successful, and writes me of the great pleasure he has of listening to the babbling warble of the birds.

In conclusion, I wish to give the results of my experiments in re-establishing these birds in communities far from my breeding colonies.

Several years ago, I sent a gentleman in Elmira, N. Y., a pair of old birds which he liberated, but not according to my instructions, which might not have succeeded anyway. He never saw the birds again.

For several years I sent Martin eggs to Chas. H. Kingsbury, Barnard, N. Y., to be hatched in Barn Swallows' nests. In nearly every instance the eggs hatched, but accidents befell the young birds. At another time I sent eggs to W. C. Horton, Battleboro, Vermont, to be hatched in the nests of Tree Swallows, which had taken possession of his deserted Martin house. These eggs hatched, but after two weeks' constant care by the foster parents, Mr. Horton found something had killed all the young birds and carried three of them away.

Mr. Kingsbury made another effort to establish the birds last year, by raising by hand, six young birds I sent him from my own and Mr. Reese's colonies. He stated that it was wonderful the number of insects these youngsters devoured, one of his farm hands occupying his entire time in tending their wants. Two of the birds died, one escaped, and the remaining three were seen with a flock of Swallows some days after they were liberated. He may see the return of these birds the coming spring. *

The White Race is not wholly responsible for the House Martin evolving in its nesting habits from the natural cavities in trees and cliffs to the elegant home-like nesting boxes with which it is now provided. True, the white man's high state of civilization and culture has perfected the scheme, but to the American Indian, who loved and honored this bird, must the credit be given for first providing rudely constructed receptacles for its accommodation.

Waynesburg, Pa., February, 1908.

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*In a letter from Mr. Kingsbury, dated June 3, 1908, he says:

"Last Friday, May 29th, a half dozen Martins came to the house on the barn and inspected it, resting on the roof for perhaps fifteen minutes. I expected them next day, and have looked for them ever since, but they have not appeared."

Later—Dec. 4, 1908—Mr. Kingsbury wrote that after the short visit mentioned above, he saw nothing of the birds.

There is a possibility of one or two of these birds being a part of the bunch of nestlings reared by Mr. Kingsbury the preceding summer, but, having associated themselves with older birds, they were enticed away from his premises to their own accustomed houses.

December, 1908.

Some 1908 Observations and Studies on the Martins at Waynesburg, Pa.

The first Purple Martin to reach my premises in the spring of 1908 arrived during the forenoon of March 27.

The weather had been fine for a week, and now real spring temperature was advancing vegetation, and spurring northward the hordes of migratory birds. By the 24th of April peach and plum trees were shedding their matured bloom, and apple bloom was nearly at full height. The air was laden with perfume of lilacs, which were beginning to burst forth in lavender hues. Scarcely any frost was seen during the past four weeks, and no damage was done by it.

Many Martins had reached this vicinity by this date. At my place the birds increased from twenty-five on the 22nd to thirty-six on the 23rd and forty on the 24th.

Inquiry and investigation at other bird-houses found about full colonies.

On the 26th, four pairs were building nests in house No. 4, and one pair in house No. 5, at my own colonies.

About sixty birds were at my boxes on the 27th, and several pairs were carrying in nest material. Vegetation everywhere was far advanced, and forests presented as green appearance as is usual in this latitude two weeks later. On this date there was a change in the condition of weather from clear and warm to cloudy, chilly days, and on May 1st I began to see a decrease in the number of birds at my boxes until the morning of the sixth, when only nine remained. On this date the temperature became more favorable to the Martins, sixteen of which were noted at my houses about one o'clock p. m. At five o'clock a thunder storm threatened and suddenly all of my birds came to their respective boxes in a compact flock.

Again the temperature fell and my birds began to decrease, until May 10th, when their number had dwindled to eighteen. On this date, however, there was a return to typical May weather and the birds were absent all day.

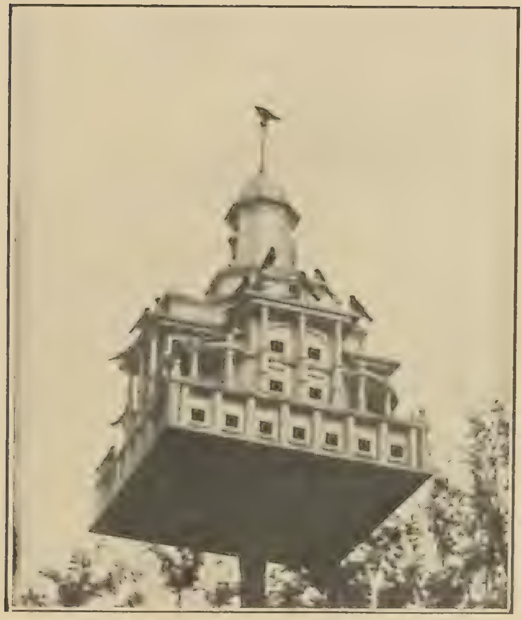

PLATE VIII.

JACOBS PURPLE MARTIN COLONY

HOUSE NO. 4 WITH A PART
OF ITS MARTIN TENANTS.
FROM A PHOTOGRAPH BY
THE AUTHOR, JULY 16, 1907

Finally, about 6 p m., they began returning, and at 7:30 I counted thirty, and when they all settled for the night, about forty had returned.

The next day, May 11th, I observed the first of last year's young, and on the 14th a total of about eighty birds was present. On this date I observed three adult pairs engaged at nest building.

For a while after the return of my birds, I had fully one hundred of them, but in going carefully over the nest rooms on June 4th, I found twenty-one nests containing eggs, and twenty-nine undergoing construction. Not all of the latter however, were ever finished, the number of nests occupied being about forty.

On July 6th, the first brood of young came out, and on the 15th nearly all were out. Only two broods remained on the 25th, and these had gone by August 3rd.

About this time I observed small flocks in the dead trees along Ten Mile Creek during the afternoons. As night grew on these birds would assemble on the wires in various parts of the southwestern part of the town, especially on West street, near High street and West Park. Here (the latter place) several hundred would assemble, and when it became dusk, all would leave quite suddenly and settle in a group of maple trees near the corner of Richhill and Franklin streets, a short distance away. On the 14th they reached greatest numbers—about 1,200 birds—and on the 16th they began to decrease, only about 200 repairing there to spend the night, the bulk, presumably, having moved on southward.

On the evening of August 6th, I observed about 600 Martins in the dead locust saplings (see Plate IX, lower view). Accordingly, the next evening, I proceeded to the place for the purpose of securing a picture of the birds. The sun had just gone down, leaving a soft light above the dark horizon line, against which the birds showed in bold relief. These trees are located on the south bank of Ten Mile Creek, opposite the west end of Lincoln street. The adjoining field, several acres in extent, at the time these observations were made, contained corn. Over the tops I could see myriads of mosquito-like flies and small beetles. Upon these insects the Martins were feeding, going out from the trees in small groups, gliding over the field just above the tassel tops, and scooping in the prey with ease. Faint snapping of the beaks as the birds came near me was audible and led to the observation noted here. There were dozens of birds—sometimes scores of them—soaring and mixing about over this field, returning anon to rest on the trees, or on a larger one directly opposite on the north bank of the stream (see Plate IX, upper view). As the evening shades grew darker, fewer birds returned to the trees, more often going to the rendezvous on wires crossing south West street, between High and Greene streets (see Plate X, central view), or the cable wires along north West street near West Park (see Plate X, upper view).

On the 9th and 11th, I proceeded direct to the latter mentioned places to make observations and take pictures. I succeeded in getting the views shown in the two upper views on Plate X, although it was becoming quite dusk when the birds finally gathered in those places preparatory to making their last flight of the evening to the maples at the Richhill and Franklin street intersection.

When the birds were apparently all settled on the wires they became quiet for an instant, then with a great swish they all left so suddenly and so swiftly that the wires tanged as if struck by a ball. So uniform was this action, and so accustomed had I become to it, that I had an instinctive knowledge when they were going to take a flight of this nature the instant before. This is a condition by which I understand what the birds are going to do, but who will explain by what signal the birds—hundreds of them—instantly become hushed the moment before taking flight.

Bearing on this subject of bird language or understanding, my observations made on Aug. 9th, at the point where the wires cross south West st. (see Plate X, central view) are of interest. After one of these sudden departures of 600 birds, about seventy-five of them came back and in their wake came about thirty Red-winged Blackbirds which lit on the wires and mingled with the Martins. After about five

minutes of blackbird-martin chattering, the blackbirds, by the same mysterious and sudden impulse, left simultaneously without so much as disturbing a Martin or interrupting their chatter.

PLATE IX.

JACOBS MARTIN COLONY.

Photos by J. Warren Jacobs.

UPPER BIRD HOUSE VIEW.

Old birds feeding young at house No. 5, erected in position of old No. 2. Photo July 14, 1907.

LOWER BIRD HOUSE VIEW.

Birds posing for their picture. View of house No. 3, looking south from First street. Photo, May 1902.

ASSEMBLAGE VIEW.

CORN FIELD VIEW (LOWER). Photo at 7:10 p. m., August 10, 1908. As many as 600 birds sometimes collected on these small dead trees, which stood on the south bank of Ten Mile Creek, opposite the terminus of West Lincoln street, Waynesburg. This was the accustomed afternoon rendezvous for more than half the Waynesburg birds after the first of August. From the tops of these trees the birds worked out over the corn in quest of winged insects which were here by the thousands.

TREE TOP VIEW (UPPER). Photo, 6:20 p. m., August 10, 1908. Late afternoon rendezvous of the Martins. Dead top of a large locust tree on the north bank of Ten Mile Creek, opposite the corn field and within the right of way of the Waynesburg & Washington Railroad Co., and quite near the track. From this high perch the birds continually dropped gracefully down to splash their breasts in the water, or to glide across to the cornfield and join their cousins in devouring insects infesting the air above the corn.

Bird Houses Erected in Anticipation of Martins.

It must be understood that the Martin is adapted to the climatic conditions of nearly the whole of the United States and Canada, from the Gulf States to Ontario, west to the Rockies. (See foot note, page 23, for exceptions). Bird houses erected anywhere within this region are likely to be occupied by Martins. Persons who try this experiment, and are rewarded by the birds taking possession, have much to congratulate themselves for. All the labor, care, expense and possibly also sacrifice of bird life, in rearing the birds by hand, is thus avoided, and the foundation for a permanent colony laid.

The interest of the whole community is enveloped in such an experiment; for in establishing a colony with only three or four pairs, is transplanted the seed which will, in a very few years, spread Martin progeny to many other houses erected for them, thus fixing a permanent foot-hold which will last as long as the birds are provided with suitable nesting-boxes and given proper protection.

Among my correspondents are several who have secured the birds by simply putting up a suitable house.

Much space would be taken describing the successes and failures of their experiments, so I selected two cases which resulted most favorably.

In April 1908, Dr. Edmund De Witt of Lawrenceville, N. J., wrote me for information on constructing a house for Martins. Although late in the season to start a house my correspondent rushed a sixteen room structure to completion and was rewarded by having four pairs of Martins to take possession.

Owing to the lateness of the season Mr. De Witt says, "Only one pair brought out any young." The people of the vicinity were greatly interested, very few of them having any knowledge of such birds.

It is safe to say the Doctor will see a return of the birds in the spring, and the community of Lawrenceville will thus enjoy the fruits of his efforts.

On May 5, 1908, I shipped one of our No. 1 style, Martin houses to R. B. Mellon, Pittsburg, Pa. Notwithstanding the lateness of the season, on the 26th of the month, a pair of Martins came and remained all day at the house inspecting the various rooms. They then went away, and two days later, presumably the same birds returned, bringing with them two other pairs and one odd bird. The three pairs built nests, and one of them brought out two and one of the others one, making three young birds in all.

These were all the Martins Mr. Mellon knew of in his vicinity. If these birds live over their southern sojourn, Mr. Mellon will see a return of them in the spring. Thus will be revived a valuable insectivorous species of bird verging on extinction in his section of Allegheny county, Penn'a. Other Pittsburg residents have become interested and conditions bid fair for an increase of these fine birds within the city limits.

Right here I want to impress persons, desiring to start a Martin colony, with the fact that the method covered in this topic is the proper way to begin.

Be full of patience and wait for the birds. Immature birds, or young reared the previous year, are almost invariably the ones first to occupy a new box. These do not reach the latitude of Pennsylvania before the latter part of April, and are usually two weeks later in selecting a nesting place. As already stated they generally return to the house where they were reared, and if this be crowded they are fought out by the older birds, compelling them to hunt elsewhere for summer homes.

Your bird-house may remain unoccupeid two or three years, but I feel safe in saying, that eventually, you will be rewarded by having the birds come.

In the belief of the writer the Purple Martin is to-day at the threshhold of a stimulating and prosperous advance, which, during the next few years, will spread its progeny over territory where it has not been seen for years. A large amount of correspondence, during past years, shows a widespread desire and longing to re-establish the Martin in communities from which the birds long ago departed. These letters—hundreds of them—have not, as a rule come from bird lovers whom we should expect to be first to have the welfare of the martins at heart, but from persons who used to see the birds during their childhood. Some of these letters are pathetic. the writers imploring me to help them bring back the birds their fathers or their grandfathers used to have in the box at the old homestead.

A great amount of correspondence, during 1908, scattered throughout the country inhabited by the Purple Martin shows that the birds had good success rearing broods whereever found, and I wish to predict a spread of the birds next summer. Especially do I believe more will be seen throughout the New England States and New York, where they were almost wiped out in 1903.

Do not allow the English Sparrow to gain a foothold in your bird house, even if Martins do not come at once. You cannot compromise with the sparrows by allowing them to use one side of the box and save the rest for the Martins. The Sparrow's one strike at a new Martin may cause it to turn its attention in another direction, thus destroying your hopes.

Attempt to Establish a Martin Colony by Liberating Old Birds.

Year-old birds may be used in an effort to start a colony in new territory, adapted to its habits, by capturing the birds soon after their arrival at their home boxes in the spring, and shipping them to a distant point, there to be liberated. They may not stay and nest in the house intended for them, but it is quite likely they will breed somewhere in the new territory.

An experiment of this kind was tried last spring, 1908, when May 23, I shipped two mated pairs of immature birds —taken from my colony—to Mr. Wm. C. Horton, Battleboro, Vermont. The birds were somewhat weakened by their

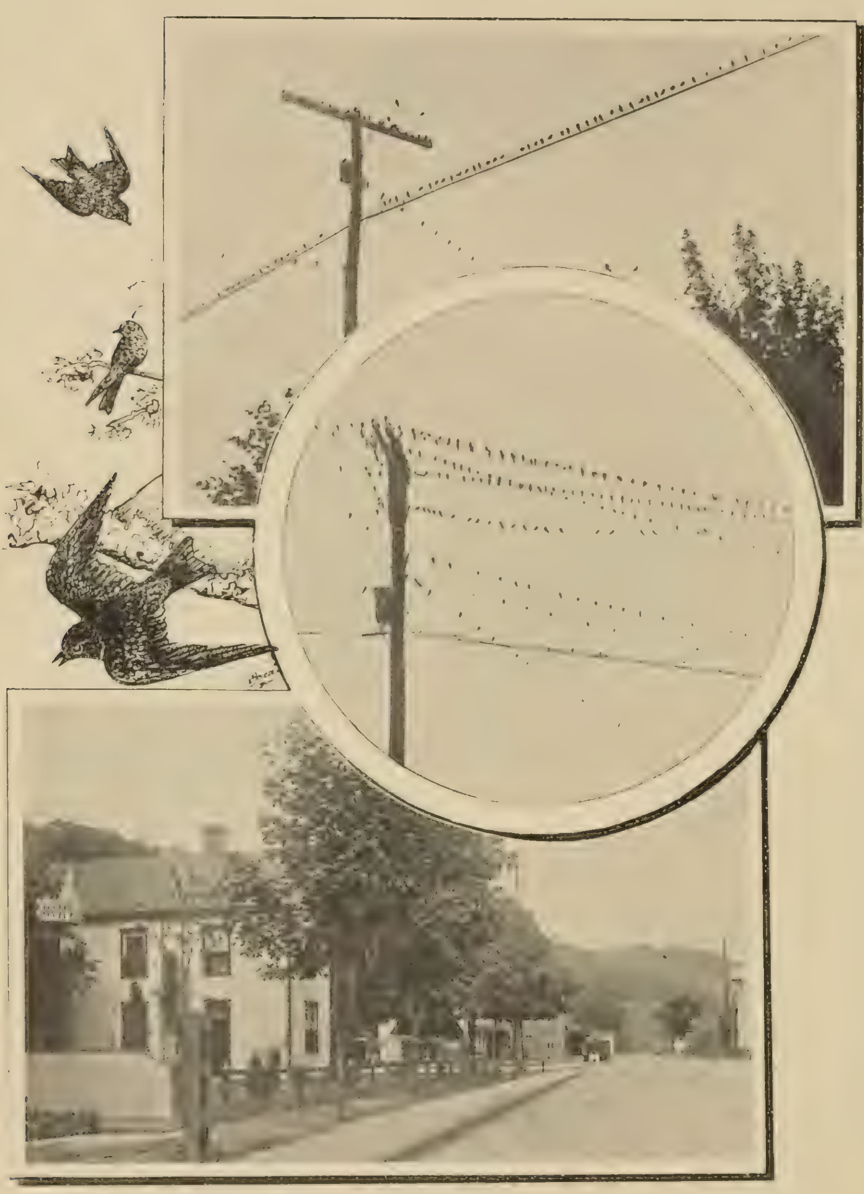

PLATE X.

FAMILIAR MARTIN SCENES IN AND ABOUT WAYNESBURG, PA., 1908.

From Photos by the Author.

UPPER VIEW, 7:25 p. m., August 8. Martins gathering on cable messenger and other wires along north West street. Four sections of lines were occupied by the birds—800 in all. Soon after taking this picture, some 400 more birds joined the ranks, but all quickly departed in a body for their chosen night quarters in the maple trees at the corner of Richhill and Franklin streets.

CENTRAL VIEW, 7:30 p. m., August 11. A part of a group of about 400 birds on telephone wires crossing south West street. The birds repaired to this place late in the evening, after leaving their afternoon feeding grounds along Ten Mile Creek and shown in part on Plate IX.

LOWER VIEW, June, 1908. Looking west on First street, near the intersection of Washington street, showing a part of the First street frontage of the premises of J. Warren Jacobs .

House No. 3 of the Jacobs Martin Colony is seen near the left margin of the picture. Between this box and the street line is where my father erected his martin-house in 1877, mention of which is made in my first article written for the State Zoological Bulletin.

In the position of house No. 4, about forty feet south of No. 3, was erected in 1896, the Author's first martin-house, which has probably been the saving of the Martins for Waynesburg, there being at that time only about a dozen pairs at the three failing bird houses in town.

Some thirty good martin-houses are now situated in the town and vicinity, from which hundreds of young are brought out every year.

long journey, having been delayed, and not reaching their destination until 3 p. m. on the 25th.

Mr. Horton put the Martins in his bird-house, provided with a sliding door, and early on the morning of the 26th removed the slides by means of a string. After a half hour the first bird—a male—came out, followed at intervals of several minutes by the other three, the two females being the last to leave.

The males seemed strong, but Mr. Horton thinks both females were too weak to survive. They were chased by other birds and were seen to fall to the ground. Nothing more was seen of any of the birds until June 10, when a friend of Mr. Horton saw a Martin soaring about in a contented manner, a half mile from his bird-houses.

It is highly probable that the surviving birds stayed in the community during the summer and may return there in the spring. It may also be possible that one or both females revived after their first unsuccessful efforts to soar the morning they were liberated.

Rearing Young Martins by Hand.

After years of study and experiment, sacrificing some birds and eggs, and accumulating much data and correspondence on the subject, I have satisfied myself that the proper way to establish a martin colony in new communities, if old birds do not take possession, is by rearing the young birds by hand.

In this way, one would come nearest a realization of his efforts to secure the birds for his own house. The birds should be procured at the nearest colony practicable when they are nearly strong enough to fly.—Perhaps about four or five days before they naturally take wing from the home nest. They should be put in a bird-house in a large light room, where they will have ample space for testing their wings, and learn to catch insects, which must be liberated for them after they learn to take the struggling prey from one's fingers.

Care should be taken to tame the birds and when they have learned to catch living prey and can fly fairly well, put a wire netting around your bird-house and erect it in the open near where you intend to allow it to remain permanently. Put your birds inside the netting and spend much time during the day in helping your birds to become familiar with their quarters, feeding them prepared food and living insects. (See next topic, including the foot-note, for information on prepared food.)

After one or two days in this confinement the netting can be taken away, care being taken to not unduly frighten the birds. Continue to feed them insects and other food which they will come to your hand for if you have succeeded in taming the birds. I find that even old birds, when wounded, are easily tamed and will come to my hand for struggling mosquitoes or butterflies, edging sidewise along a wire or tree branch.

If you succeed in taming the birds and bringing them to age and strength of caring for themselves, the chances are very favorable for their returning to you the following spring.

See result of Mr. Kingsbury's effort to rear young Martins by hand, page 27, including the foot note.

Effect of Removing to a New Location, a Martin House with the Parent Birds and Nestlings.

During the summer of 1908, correspondence with Mr. Daniel C. Robinson, Boston, Mass., led to a promise on my part to furnish a few young Martins to be reared in his bird-house at his summer place, near Manchester, Maine. Before the time came to ship the youngsters, Mr. Robinson had taken an extended automobile trip through several counties in Maine, discovering several breeding colonies of Martins, one of which he purchased and removed to his home place.

The result of this experiment I give herewith, quoting in full from that part of Mr. Robinson's letter dated November 25, 1908.*

"At your suggestion I arranged with the owner of a house full of Martins, buying the whole outfit, and had them brought by automobile in the night to my premises and set upon a pole. In the morning, the netting being removed, seven or eight birds flew away, some old, and, I think, some young ones. The rest, about twenty-five, I took out and undertook to bring up by hand, placing them in boxes where I could get at them conveniently. For about three days I was obliged to force their mouths open and feed them with grasshoppers and a mixture of bread crumbs and hard-boiled eggs. After a while a man from a neighboring town brought me three more, and a few weeks later I obtained ten more. I treated them in about the same way. After about a week they began to die with something like pneumonia, that is, they would show signs of distress in breathing and have a shortness of breath, like panting. They would live for about three days after these attacks. I wrote to a bird dealer in Boston for advice regarding food, and he sent me a supply of prepared food for soft billed birds. They seemed to thrive much better on this diet, although by this time there were left only about ten. I fed them a very few grasshoppers, but mostly the prepared food and occasionally a few house flies. They became so tame that they would fly up into the trees, and about the buildings, returning to our hand or their box to feed, but one by one they contracted the fatal disease and died like the others. The few birds that escaped during the process lingered about the premises for a time, and I have faint hopes of their returning.''

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*Referring to a similar experiment, I quote the following from Circular No. 56 U. S. Dept. of Agriculture, Bureau of Biological Survey.—Value of Swallows as Insect Destroyers. By H. W. Henshaw.

"This experiment was tried in the zoological gardens at Philadelphia in 1889 by Mr. Robert D. Carson, who, by means of a trap house, secured a a colony of nine pairs with 32 young from the grounds of Mr. Josiah Hoopes, of West Chester, transporting them the distance of about 20 miles by train at night. When released next morning the old birds deserted the young and returned to West Chester. The temptation of the old home so close by proved too strong even for parental affection. Most of the young however, were successfully raised by hand feeding, being fed chiefly cockroaches, grasshoppers, crickets, meal worms, and "prepared food." This is a mixture intended for insectivorous birds, and according to Mr. Carson was well liked by the nestlings and agreed well with them. It consists of "dried and ground beef heart, meal, ground zweiback, boiled and mashed white potatoes, grated raw carrot and grated hard-boiled eggs." Probably any similar mixture would answer equally well. A small colony resulted from this experiment which would probably have proved permanent but for the fact that additional houses were put up in West Chester, and after two years the colony deserted to the old neighborhood. Though only temporary success was achieved, the experiment is encouraging and points the way to ultimate success. For the above facts I am indebted to Mr. Charles J. Pennock, of Kennett Square, Pa."

Dated April 27, 1907.

In the opinion of the present writer these birds did not desert the Zoological Garden and return to West Chester because additional boxes were put up in the latter place, but because conditions of the new quarters, when they returned twice to breed, did not appeal to their instincts. Perhaps the place was too public, the position or height of the box not to their liking, or the box itself not suitable for successfully rearing their young.

A disaster of this magnitude to the Purple Martin is to be deplored, especially in a section of country where the success of every brood is needed to replenish the species. Here are about forty young Martins, most of which perished after being taken from the care of the parent birds, at a time and under such circumstances, that the parents hardly attempted to rear second broods. Now these forty nestlings would have gone far toward replenishing the former range of the species upon their return north in 1909.

Mr. Robinson spared no expense and went to much trouble in his effort to transplant this colony of Martins, but has probably come so near failure that I shall hesitate to suggest the plan again.

Result of Hatching Eggs of the Purple Martin in the Nests of Other Birds.

My first experiment in hatching Martin eggs in the nests of other birds was in 1905, when on May 22, I sent twelve to Charles Kingsbury, Barnard, N. Y., for placing in some Barn Swallows' nests. Three nests of the Swallows were selected, their eggs removed and those of the Martin put in. One of these nests was deserted immediately by the old birds, who built another near by.

Lack of time prevented Mr. Kingsbury from giving attention to the others. While he noted the old Swallows to go back on their nests immediately they did not complete incubation, for several weeks later he found the nests deserted and the Martin eggs intact.

In sending these eggs to Mr. Kingsbury, I advised removing a part of the Swallow eggs and substituting two or three of those of the Martin. For some cause, probably on account of scarcity of Swallows nests, he removed the entire set of the rightful owner and substituted three and four eggs of the Martin.

The fact that the eggs of the Purple Martin are twice as bulky as those of the Barn Swallow and are pure white, whereas those of the latter are highly spotted, may be the cause of immediate desertion by the Swallow.

However that may be, the following summer, 1906, he experimented by removing only a part of the swallow complement from three nests and replacing them with pairs of Martin eggs in two cases and a single one in another. This was done about 7 or 8 of June, and in a letter dated June 27, Mr. Kingsbury informed me that one Martin had hatched; and a week later (July 3), he wrote that the young Swallows in the other two nests had flown. The Martin eggs had become addled on account of being placed in the nests too late. In his letter of July 10, he writes that a few days previously, the swallows took their own offspring, two in number, now fully able to fly, from the barn and aban-

PLATE XI.

Misfortune which Sometimes Overtakes our Beloved Martins.

A cause for helping and encouraging these valuable birds, lest their numbers decrease and eventually be wiped out by some dire calamity of the elements.

Photos taken at the Jacobs Martin Colony.

Houses Nos. 1 and 3 (latter in the foreground) as they appeared covered with a heavy, slushy snow, April 9, 1902. It had snowed during the night to a depth of eleven inches, upon unfrozen ground. The morning dawned with a softening temperature which soon caused the snow to melt, starting slushy torrents and rivulets in street and field.

Six Martins were quartered in each of Nos. 2 and 3 boxes, and these would thrust their heads out of the little room entrances and twitter.

Sometimes these early April ''cold waves'' are attended with a steadily decreasing temperature, which often continues for days, causing the Martins to die of starvation and exhaustion.

The other picture is from a photograph taken June 15, 1903, and shows what sometimes happens to the Martins in mid-summer during a cold wet period.

Only one brood of nestlings survived a three days cold, wet spell of weather. The groups of dead birds were taken out of their respective nest rooms in houses Nos. 2 and 3. Three adults and eighty newly hatched young ones are shown in the picture. Four other small young, taken from under one of the dead adults succumbed after a few hours.

Where the parents themselves survived this unfortunate period they rebuilt their nests and brought out late broods.

All the colonies in and about the town suffered the same fate, their keepers reporting many dead adults and scores of young.

doned the foster offspring to his fate. The next day he saw a swallow enter the barn, but on the following morning the young Martin lay dead on the floor.

From this experiment it would appear that when any of the offspring of the rightful owner is left in the nest, the young Martins must be taken out and reared by hand after the old swallows forsake them and fly away with their own young. Barn Swallows become fledged and are able to fly from the nest in two weeks, whereas Martins remain in the home nest four weeks after leaving the shell.

Now it became evident that if it is desirable to have the Swallows hatch and care for the Martins until they are able to look out for themselves, elimination of their own eggs must be accomplished. To accomplish this, three methods seemed open to pursue. One was by cautiously removing the Swallow's eggs, one by one, after the old bird began incubation. Another was to dispose of the young Swallows as soon as hatched, which will be in advance of the Martins a day or two. The third was an exchange of young by consigning all Martins to one nest and all Swallows to another soon after hatching. The latter plan would be the more humane way, and should be followed whenever possible. The exchange, however, must be made when the young are newly hatched and about of even age.

It must be understood that the value of the Barn or any other species of Swallows as insect destroyers, is about on a par with the Martin, and persons should hesitate to sacrifice the former in the interest of the latter. No sacrifice of Martins takes place at the home colony, in supplying a few eggs, for only persistent robbery will cause the old birds to abandon their home box.

Two experiments were made in 1907; nine eggs from two nests in house No. 5 were used. Five of these went to Mr. Kingsbury and four to Mr. Wm. C. Horton, Battleboro, Vt.

Mr. Kingsbury's efforts resulted in failure,—one nest containing two Martin eggs, becoming detached and falling to the floor, while in the other case, the Martin eggs had been placed too late, incubation being only about one-half complete when the young swallows appeared.

The experiment tried by Mr. Horton came very near success and I give his report in full which he copied from his daily record. Mr. Horton used to have a large colony of Purple Martins, but in 1903, all were killed or driven away by adverse weather conditions. For three years Tree Swallows (*Iridoprocne licolor*) had occupied the old martin-house. In the nests of these birds Mr. Horton wished to place Martin eggs.

MR. HORTONS' REPORT:

May 31, 1907, Receive four Purple Martin eggs from J. Warren Jacobs, Waynesburg, Pa.
June 1, 1907, I find six Tree Swallow eggs in nest. Remove four eggs and place the four Martin eggs in nest.
June 6, 1907, Remove the other two Tree Swallow eggs, leaving the four martin eggs only.
June 11, 1907, Swallows sitting on eggs,—O. K.
June 15, 1907, Eggs not hatched.
June 16, 1907, 7:00 a. m. Find one egg hatched.
June 16, 1907, 6:00 p. m. Find two more eggs hatched.
June 17, 1907, 7:00 a. m. Find the other egg hatched.
June 19, 1907, Visit the young Martins this morning; find them doing well.
June 22, 1907, Visit Martins this morning, find them growing and looking fine. Eyes not open yet and not a feather started. Foster parents feeding them nicely.
June 24, 1907, 6:00 a. m. Visit young Martins. Find them progressing finely. Feathers begin to show under the skin. Eyes just beginning to open. Young birds being well cared for.
June 25, 1907, a. m. Find Martins' eyes about one-third open; feathers just begin to protrude through skin.
June 26, 1907, 6:30 a. m. Young Martins' eyes open; feathers well started through skin; tail feathers show quite a little. All four young are plump and fat. Foster parents giving them best of care.
June 29, 1907, 7:00 a. m. Visit the martin-house; find no young Martins in nest; find one on ground un-

> der house. Could not find the other three. From appearance of young bird found on the ground, should say it had been dead two or three days."

What caused this disaster is a mystery. It may have been the work of a Screech Owl, or Sparrows. One or both old birds might have been killed, thus leaving the nestlings to die of starvation, and in their agony they fell to the ground. It is barely probable the swallows became aware the youngsters were not of their own kind and deserted them.

Bluebird vs. Martin.

If success with the Martins is to be expected, the Bluebirds must be eliminated from the bird-house. Bluebirds are too valuable to be killed for selecting a nest site in a martin-house, so one must be patient and strive to induce them to occupy other quarters, which may be a rough, quickly made box, placed seven to ten feet up on a post in the immediate vicinity.

I have already touched this subject, but wish to relate the experience of Mr. Charles Thompson, of Waynesburg, during the summer of 1908, which will lead the way to success in other and similar cases.

Bluebirds had built their nest and the female was brooding her eggs when the Martins came to the house which the former were occupying. For ten days the Bluebirds had successfully kept the Martins away—one going for food for the young birds while the mate kept watch over their home.

Mr. Thompson wished the Martins to occupy the house and asked me what to do. My suggestion was to remove the Bluebird nestlings, place them in a temporary bird-box and erect the same a short distance from the martin-house. This he did, attaching the box to a telephone pole about fifty feet away, and in less than five minutes the parent Bluebirds were contentedly feeding their young in the new quarters.

Although it was now late in the season, three days later (June 14) Mr. Thompson told me he had three pairs of Martins building their nests undisturbed by the Bluebirds.

First Supplement

TO

GLEANINGS No. 5

ISSUED NOVEMBER 1, 1909

⁂

The Purple Martin
(Progne subis)
and Houses for Its Summer Home

BY

J. WARREN JACOBS
Waynesburg, Pa.

⁂

HAVING access to the correspondence of the Jacobs Bird House Company, I wrote each purchaser of a martin house for a report on the result of the first season's experiment, intending to make use of the items in the company's new 1910 catalogue.

However valuable these reports might be as testimonials in a catalogue soliciting patronage for our bird houses, I have concluded the information is too valuable to waste in that manner. Therefore, with the object in view of putting this information in appreciative form for martin lovers, I have decided to issue this supplement to "Gleanings No. 5", incorporating the main portions of these reports and adding such items of interest, coming to hand, which will be of assistance to persons desiring information on the martin subject.

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It is the purpose of the author to compile three or more annual supplementary papers to "Gleanings No. 5," giving the results of the efforts to establish home colonies of martins, by purchasers of bird houses. This issue is mailed free with each copy of "Gleanings No. 5".

Photographs, suitable for halftone reproduction, and items of interest to lovers of the Purple Martin, are solicited from all sources. The writer especially desires photos and full reports from purchasers of martin houses. Full credit will be given for all such material used in future supplementary papers.

Martin houses were purchased by persons residing in twelve different states and the District of Columbia. In eight states—Maine, Connecticut, Pennsylvania, Maryland, West Virginia, Michigan, Illinois and Wisconsin—success crowned the efforts of nearly all those making an attempt to establish the birds. Reports were not returned from all the purchasers residing in Massachusetts, New York and New Jersey, but in the seven reports coming to hand from these states and one each from New Hampshire and District of Columbia, birds were not reported as breeding, although in a number of cases martins visited the new boxes.

About seventy per cent. of the martin houses sent out this year were occupied by the birds during the summer, hatching and successfully rearing broods. So large a percentage I consider good, inasmuch as many of the houses were put up in localities where the martins were seen only as migrants.

Much correspondence came to hand from other sources, and a more or less thorough examination of the evidence contained in this correspondence, together with that contained in the reports, show the birds to be sparingly, but pretty generally, distributed over sections of the Eastern States where it was thought to be almost extinct. There seems to be several flourishing colonies in western and southern Maine and northern New York, but in the other New England States and eastern New York only few correspondents mention breeding birds. Many transient companies of the birds, however, were seen, some of which visited new bird houses for a few hours, then departed.

The reader is referred to Mr. Wm. C. Horton's report of his experiment in liberating two pairs of adult birds at his Brattleboro, Vt., home in 1908. ("Gleanings No. 5," pages 34-36.) This experiment, Mr. Horton thinks, was partly successful, as he reports a lone martin at one of his bird houses during the first week in June, 1909.

In the Middle States, west of the Appalachian Mountains, and in the Central States, there seems to be an abundance of the Purple Martin, the states of Michigan, Wisconsin, Indiana and Illinois being favored with the largest numbers. In Ohio, Pennsylvania, West Virginia and Missouri are many flourishing colonies. Western New York, New Jersey and northeastern Pennsylvania seem to be blessed with widely scattered colonies; but then I have a scarcity of correspondence from these sections, which may be cause for a wrong presumption in these cases. From evidence contained in the correspondence from this region and from the New England States, the Spring of 1909 was very backward, delaying agricultural pursuits on account of ice and frost. Among the letters calling attention to this fact is that of Mr. Daniel C. Robinson, Manchester, Maine, given in full below. His statement that some of the birds occupied his new bird house all summer but did not attempt to nest, proves further that weather interruptions discourage the martins in their parental duties, to the extent of passing the summer season without rearing broods.

It will also be remembered (See "Gleanings No. 5," page 37) that Mr. Robinson experimented, last year, in moving a whole colony of martins several miles, and although the parents deserted the young, many of which died, he succeeded in rearing some of the nestlings and these are undoubtedly the birds occupying his boxes this year.

The following letters, in whole or in part, are from persons who seemed to have the best success in inducing the birds to occupy their new boxes. Halftone reproductions are given where photos were submitted.

MANCHESTER, Me., August 3, 1909.

My dear Mr. Jacobs:

I am pleased to acknowledge receipt of your recent letter and to say that the Purple Martins came to my three houses this season very much to the joy of my family and neighbors. As I have written you, I think, I put up a house two years ago but none came. This season I put up the house I bought of you. I also put up one that I made at the farm house near by. The martins were very late in arriving this year all over the state as the spring and summer were very late—planting being fully a month behind usual time. But at last the birds appeared, first about my houses on the shore of the lake in a grove, and then at the farm house some 500 feet away. They were very lively and chirping and calling each other, but for two or three weeks they did not begin to nest. At last three pairs began nesting at the farm house—although there was a pair of English sparrows on one side of the house and a pair of bluebirds on the other. They came to both my houses at the shore of the lake, but after going in and out of the two houses there for about a fortnight, they decided to live in your house and five or six martins have continued to fly in and out there ever since, but they have not nested I think, but some part of every day they come and fly about and enter it. Also they fly high above the tall pines, of which the grove is composed, for hours.

The pairs at the farm house have hatched and are now trying to induce the little ones to fly.

So I feel abundantly rewarded for all the work I did last year with the young ones, for I must conclude that some of them that got away from me lived in the vicinity and returned this year.

Yours very truly,

Danl. C. Robinson.

Booth Lake, Wisconsin, June 20, 1909.

Mr. J. Warren Jacobs,

Dear Sir:

I enclose photo of bird house my son bought of you. The birds have taken to it well, with exception of the first story—or floor. Why can that be? Do you think on account of the columns? I will also ask if the rooms should be cleaned in fall, or spring?

Yours respectfully,

Box 69, East Troy, Wis. S. J. Peterson.

Note—In my opinion the birds avoided the lower part of the house on account of the branch stubs supporting the same, especially if new leaves and twigs were allowed to start out on these. This is a pretty effect in mounting a bird house, but new branches growing up around, and obscuring the box will eventually cause the birds to abandon it. It also exposes the nests to greater danger from cats, and other destructive animals and snakes. I might say, however, regarding the birds' preferring the upper stories, that in new boxes the upper rooms are usually first selected, and as the colony grows the lower floor rooms are filled.

(J. W. J.)

Pontiac, Michigan, August 5, 1909.

Mr. J. Warren Jacobs,
Dear Sir:

Early in the Spring about fifty martins came to the old house of ten rooms. The house was placed on a dead hickory tree, cut down to about nineteen feet in height.

Fearing that some of the birds would locate elsewhere, we were very anxious to get the house ordered from you. It came promptly. It is prettier, and made more substantial and at less cost than a carpenter would make it here. For appearance, convenience and safety the iron-hinged pole is also of greater advantage.

The martins took possession immediately. Then followed three weeks of cold stormy weather.

One night we saw them huddled together against the doorways. The next morning only seven were in sight. These seven would circle and flutter around the house, in a distressed sort of way.

We placed food on high poles and scattered bits of suet on a pan of water, hoping they could skim over it and get enough to sustain life, but it was probably of no use. Five died. Two—apparently strong, beautiful birds—we found on the ground. We took them into the house, opened their bills and fed them warm milk and a little prepared food. They seemed to brighten up for two days, but they were too chilled and exhausted to survive.

When mild weather returned a flock of martins came and filled twenty-five rooms. The ever watchful sparrows had taken the remaining two rooms. A red-headed woodpecker had captured one of the hickory limbs. It proved a valiant fighter and aid when a red squirrel climbed up and robbed some of the nests.

Discovering this menace to the eggs, we put a flaring tin band around the trunk of the tree, which prevented further molestation.

Up to this time your book, describing the habits of martins, had not been sent us. Therefore we passed through all these experiences and heartbreaks in ignorance of many things. There are now many young birds. The problem of sleeping quarters seems to be a serious one judging from the musical expostulations at twilight.

Next year we intend to add another house. The present colony is so popular that our enthusiastic guests and neighbors often make pilgrimages to the garden to see them.

Thanking you for your interest and valuable information.

Yours truly,

O. P. HOFFMAN.

P. S. I have no photographs and I am not able to count the birds as we did at first.

March 10, 1909, we filled an order for a style No. 2, complete, for Wm. McConway, Pittsburgh, Pa., shipping the same to his summer home at Torrington, Conn.

Writing from his Torrington home, August 1, 1909, Mr. McConway writes:

"Replying to yours of 29th ult. I have had one pair settle and raise a brood of four (4) young. The sparrows have been very troublesome, otherwise, I am of the opinion we would have had a greater number.

Yours very truly,

WM. MCCONWAY."

PARKERSBURG, W. VA., August 21, 1909.

MR. J. WARREN JACOBS, Waynesburg, Pa.

Dear Sir:

In reply to yours of July 27, have just returned from an extended trip to the west, and found your letter on my return.

In regard to the bird house; after receiving it from you I put it up on the 12th of March, as I thought perhaps there might be some stragglers come along early and locate it. But none came, and I heard none around here at all until after the middle of April, and still none came to the house. April passed, and May came and passed, and I had despaired of having any birds at all, as I supposed that they were all settled somewhere else. But about the middle of June a couple of prospectors came and took a look at the house, and were apparently very well pleased with appearances, and in a few days more came. But in the meantime the English sparrows had not been idle, and had built one or two nests in it. When the martins came around, the sparrows laid low and did not have very much to say. So the martins took immediate possession, and I think there were two nests built, but perhaps only one; but sometimes now I can count as high as ten martins on the house at one time. I am sure that I will have a fine colony next year, as they now have it located, and will come early in the spring. Every one who sees the house admires it, and say it is the finest they ever saw. If I can get a satisfactory snap shot of the birds I will be pleased to send you a picture. If I cannot get it this season, I will be sure to get it next year. The next time I get any ways near your city I want to call and see you, as I would be glad to meet you, and also see the large bird colonies you have there.

Very truly,
WALTER DONAGHHO.

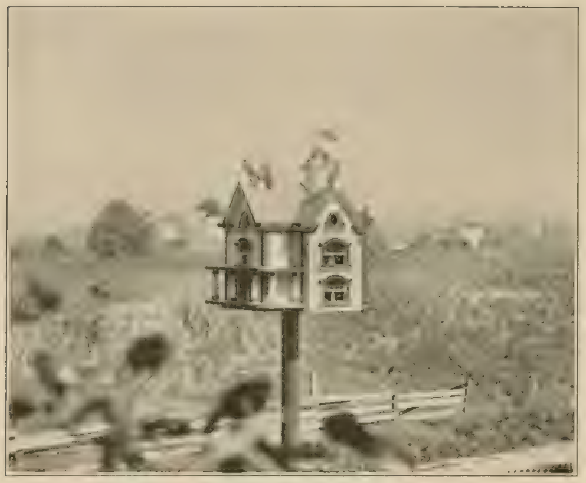
PARKERSBURG, W. Va., September 11, 1909.

MR. J. WARREN JACOBS, Waynesburg, Pa.
Dear Sir:

Inclosed please find photo of my martin house in position with birds on it, and flying around it. This was taken on the 22nd of August, some time before the martins left here. They seem to stay here longer than with you, as I saw a pair here as late as Saturday, September 4th. I have seen none since that time. I have derived a great deal of enjoyment from the society of the martins this season, and hope to have a large colony of them next season. I am going to take the house down this fall, give it a cleaning out and put it in the dry until next spring, as I do not want the English sparrows to occupy it this winter to its detriment.

Very truly,
WALTER DONAGHHO.

Mr. Donaghho's bird house is shown on following page.



Oil City, Pa., June 6, 1909.

Dear Mr. Jacobs:

My martin house for past two days has been very interesting. I think there are now either seven or eight pairs located and quite a number of visitors come and go, as I find on investigation that there are several colonies in the city. The first pair took up quarters in the north gable room and then others took possession of the porch rooms. I set the house with the porch facing the north and side porch to east. In one of the south rooms a pair of wrens have established themselves and, as they seem to mind their own business, I thought I would not disturb them in their home making. In this I may have made a mistake, as a friend informed me this morning that he knew of a case where the wrens had destroyed the martins' eggs and killed some young martins. I hope by the end of the month to have a house full of martins. I have sent to Harrisburg and Washington, D. C., for bulletins on these birds and will keep close track of them, as all the family have gotten interested in the cheery chattering neighbors. They are large sized birds—the dark males particularly, and they too, the males, seem to build the nest, or, carry most of the material. I thought I saw them to-day with a beak full of mud.

Next year I shall put up a much larger house, if all goes well.

Yours truly,

S. Y. Ramage.

OIL CITY, Pa., August 18th, 1909.

Dear Mr. Jacobs:

Your letter came duly to hand having been forwarded to me in the west. I was absent from July 24th until August 13th and during that time the young birds must have come out. In the last three or four days the only time I have seen the martins is in the evening. There are about a dozen that seem to come back to stay over night in the house.

I presume they will soon fly away for the winter. I am going to try next year for a much larger colony, as I have had much pleasure, and my family, too, have watched them with much interest this summer.

Very truly,

S. Y. RAMAGE.

The accompanying illustration is from a photograph taken two hours after putting up a style 5 house on the residence grounds of Frank L. Black, West Elm St., Waynesburg, Pa., May, 1909.

Mr. Black has had two flourishing colonies of martins for several years, both houses being built by the writer. The box here reproduced was erected in place of one (a style 2) which had been up continuously for eight years. In making the exchange of houses, twenty-four martins were routed out of the old house, but all soon settled on the new one although of entirely different pattern. Sixteen of the birds had come to the house before the men were done adjusting the pole.

Only one other house was put up for Waynesburg citizens this year. This was at "Morningside", the beautiful suburban home of A. I. Cooke, southeast of town. This is a new location and the birds were late in taking possession. Seven pairs built nests and reared young.

The following cut is a style No. 7 martin house in position, purchased by Mr. George P. Perry, Sterling, Ill., March, 1909.

Under date of July 28, 1909, Mr. Perry writes:

"I succeeded in getting seven or eight pairs of Purple Martins to occupy the house. There were three or four of the rooms taken by the sparrows before the martins reached here, and they remained in the house the entire time. There were several broods of martins hatched out. Two or three young fell to the ground and perished. Yesterday some time, all the martins left. I think it was not much before May 1st that they fairly were in possession of the house. We have enjoyed them very much this summer.

George P. Perry."

Mr. Newton L. Partridge, No. 2031 Sheridan Road, Chicago, Ill., ordered a bird house shipped to Princess Anne, P. O., Maryland. Following is his report:

Chicago, Ill., August 6, 1909.

The Jacobs Bird House Co.,
Gentlemen:

I purchased one of your style 9 Martin houses this spring. Unfortunately I neglected to keep a record of events but I will give you all the facts I know. I did not set the box up until after the first of April, which was in plenty of time, however.

At first, about the middle of April, I believe, I saw my first martin of the season flying about the house. The next day there was a brown one with it, whether a female or immature bird I don't know. The adult males kept increasing in numbers until about a week after the first arrival there were fourteen birds about the house,—all but one,—males in the black plumage. Then they rapidly decreased in numbers until only one male and the brown one were left. Soon after this, a little less than a week, I think, a number of females appeared,—about ten or eleven. They remained several days, and males appeared again. Not enough to be as many as the females, but about six. Those females who were unfortunate enough not to get males left in a couple of days. There were seven pairs which nested in the box and the young are now flying, so there are from twenty to twenty-five about most of the time. I expect to get another box next spring to take care of the increase.

I am much pleased with results this year as I had only hoped that I would get one or two pairs at the most—and I feared I would get none.

Respectfully,
Newton L. Partridge.

Beware of the Screech Owl

A few years ago I thought screech owls were molesting my martins, but upon investigation I observed nothing to substantiate this fear, except on one occasion, when an owl lit on the porch of one of the bird houses, but quickly flew away. As it did not enter a room I concluded my birds were safe; but here comes a report to the effect that the owls do not enter the rooms to capture the birds, but nevertheless satisfy their appetites and are very destructive to a colony of martins when once they begin making visits to the same.

During the past summer a carpenter from this town was repairing a house in the country, the yard of which contained a well filled martin house. He said he became much interested in the birds, and while watching them in the evenings he observed a screech owl go to the box but did not enter. Later he heard a martin struggle as an owl flew from the bird house. Upon closer observation he discovered that the owl clung to the entrance perch, thrust a claw through the entrance and drew out a young bird, then almost fully fledged. After witnessing a repetition of this performance several times on consecutive evenings, he procured a gun, and, to his surprise, dropped screech owls to the number of five from the cupola of the bird house as they came at different intervals during one evening.

Second Supplement

TO

GLEANINGS No. 5

⁂

The Purple Martin

(Progne subis subis)

and Houses for its

Summer Home

BY

J. WARREN JACOBS

Waynesburg, Pa.

ISSUED NOVEMBER 1, 1910

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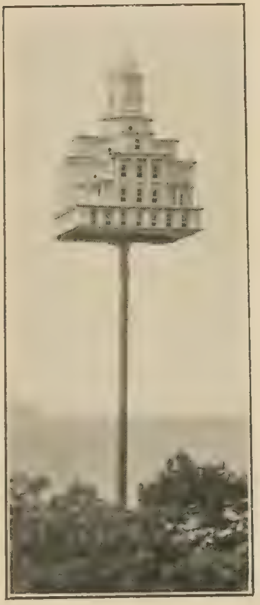

NOTE

THIS, the Second Annual Supplement to Gleanings No. 5, aims to present further useful and instructive information to persons interested in the Purple Martin.

A list of persons who have put up our Martin houses is given; further results of the author's observations on the Martins at Waynesburg, Pa., is presented, together with information gleaned through correspondence with admirers of the Martin birds, including

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reports from many persons who have provided the birds with Jacobs Martin houses.

These are accompanied by comment and annotations by the author, and the text is profusely illustrated with halftone reproductions of bird-houses in position.

Among the annotations commenting on reports will be found hints and items of interest and value to Martin lovers. Special attention is called to the remarks on protecting occupants of houses mounted on wood poles or trees, from the ravages of cats, squirrels and other destructive animals and snakes. In the latter connection particular attention is pointed to Mr. W. Scott Way's experience with destructive black snakes and the author's lengthy annotation on the destruction of birds by snakes, and the real or fancied supposition of the snake's power to "charm" its intended victim.

The Third Supplement will be issued November 1, 1911, when the author hopes to enlarge the work by adding further useful information and more interesting reports from purchasers of Martin-houses and halftone reproductions of houses in position.

THE AUTHOR.

October 25, 1910.

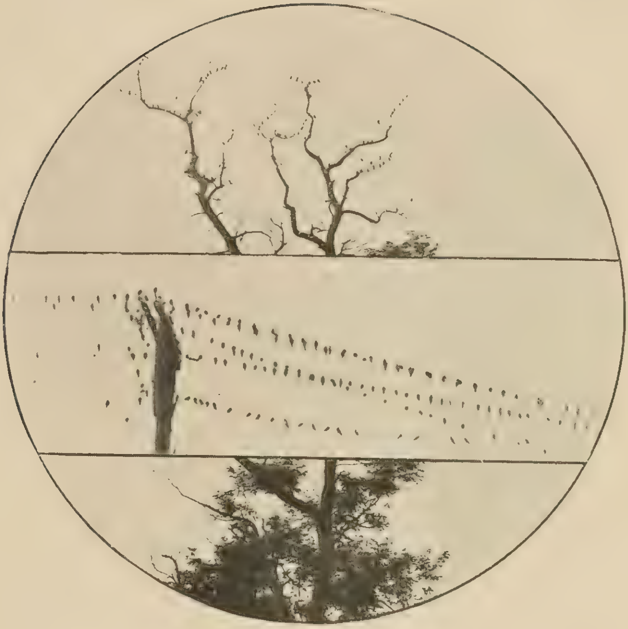

FIGURE 3

Migrating Martins collecting on telephone wires and dead tree-tops at Waynesburg, Pa. (From Photos by Jacobs.)

IN presenting this, the Second Supplement to "Gleanings No. 5, The Purple Martin and Houses for Its Summer Home," I am pleased to state that the interest in these fine birds is increasing. This is evidenced by an increasing demand for catalogues, larger volume of business by our factory, and the growth of our correspondence relative to these birds and their houses. This interest is also shown by the number of reports sent in by many correspondents, accompanied by carefully taken photographs of their bird-houses in position.

From reports along the Gulf Coast, early in 1910, I learn that adult birds were late in reaching our southern coast, and as a matter of fact, correspondingly late in reaching their summer haunts in the North. The earliest date I have for south-western Pennsylvania is

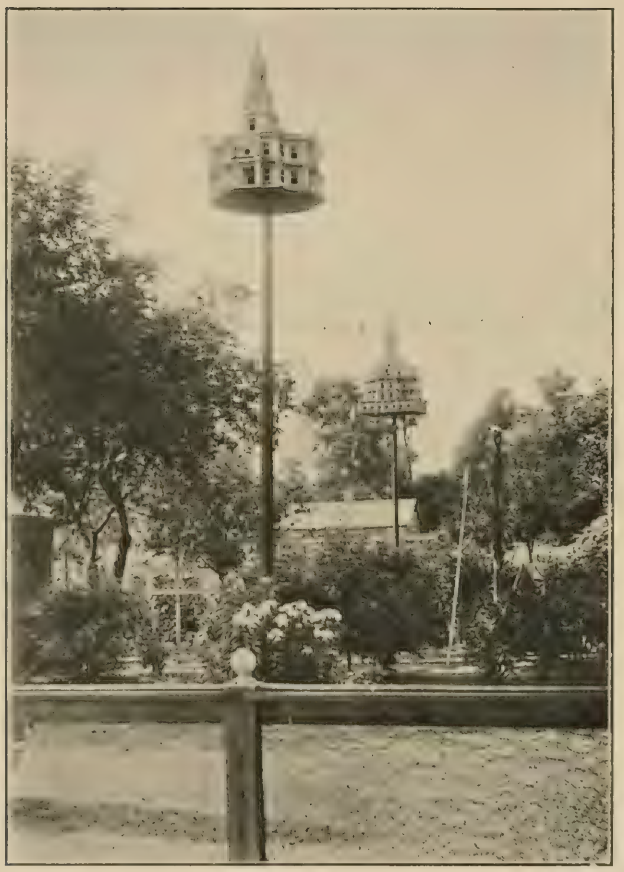

FIGURE 4

Houses 3 and 4, Jacobs' Purple Martin Colony, Waynesburg, Pa. Looking south from First Street and showing method of stretching wire between buildings or trees for the birds to rest upon. (Photo by Jacobs, July 17, 1910.)

March 19, but this is unusually early, the normal date being the last few days of March.

The first arrivals for 1910—two birds—came to my houses March 28, but up to April 8 only ten birds had appeared. Weather unfavorable for returning Martins was experienced during the latter half of April, and May 1st arrived before the full percentage of my adult birds had returned. About this time I observed the first signs of nest building, but these operations were stopped on May 3rd, when a cold northeast wind brought us a chilly atmosphere with frequent rains, housing the martins and preventing them from procuring food.

This cold wave terminated in freezing and killing frosts on 6th, 7th and 8th, since which time up to May 17th we had only two or three days suitable for nest building, and on these days the famished birds were compelled to forage for food, for at other times the days were wet and cold, driving insects to cover.

Up to May 20 no immature Martins, or young of the previous year, had appeared at my Martin houses. The return of the immature birds is an important factor in establishing a new colony, for they are driven away from a crowded house by the older birds and must find nesting quarters elsewhere. As a rule these young birds follow the migration of the adults two or three weeks later in their return from the South, but are usually on hand by the last of April.

The first individuals of last year's broods arrived on the 21st of May—four birds. The bulk of these immature birds were very late in arriving, and only a few of them attempted to nest at all.

From my records of May 24th, I see that very few of my adult birds had finished their nests, and no eggs had been deposited up to that date. In favorable seasons most of the adult birds have deposited their eggs by this time.*

From early summer correspondence I learn that generally, un-

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*Notably in 1906, thirty nests contained eggs on May 24th, one set containing highly incubated eggs; and on May 25th, 1903, thirty-seven nests contained eggs. However, this is the year in which a few days cold, wet period, at hatching time in June, killed all the young and three old birds at my colonies. (See Gleanings No. 5, page 41 and plate XI.)

The next year, 1904, the count was made ten days later, June 3rd, when thirty-one nests were found to contain eggs. On the 22nd of May, 1905, only eight nests contained eggs, while fifty nests were undergoing construction.

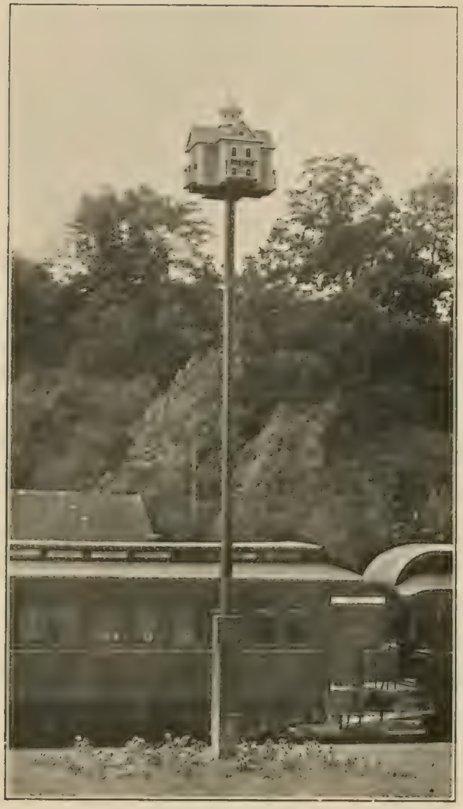

FIGURE 5

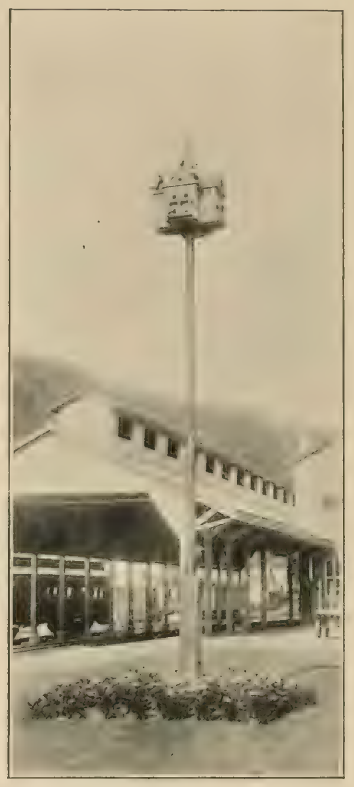

FIGURE 6

Fig. 5—Style No. 1, Martin house erected April 22, 1910, for Supt. C. E. Bower, in the center of a small green plot in front of the Waynesburg and Washington Railroad depot. The location is thirty feet from the main track where all passenger trains arrive and depart, and thirty feet from a very busy street where freight and passenger transfer vehicles rattle over the pavements, and whirling automobiles glide almost continuously. On date of taking this picture, June 19, the house contained nests of three pairs of Martins, two of which later abandoned their work before depositing eggs.

Fig. 6—A snap shot of this house showing a half dozen non-breeding birds paying a visit to the lone pair which nested in it.

favorable weather for nesting Martins prevailed throughout eastern United States, interrupting and delaying them in their nesting duties.

Unsteady weather at the time the Martins are engaged in nest-building causes them to frequently abandon their work temporarily; and if these unfavorable periods are protracted or duplicated, many birds become discouraged in nest-building, possibly because they become famished and must turn their attention to foraging over new territory to sustain life. In this way, however, new houses are located, and thus the foundation laid for new colonies; for I find that birds driven away from their home boxes by these conditions do not, as a rule, return there the next year; while a house occupied by non-breeding occupants one year will contain early tenants the next.

At times when the Martins are frequently broken up in their nest-building duties by unsteady weather and other conditions, much fighting is indulged in by them, and this is a cause for many leaving the vicinity, or dying of exhaustion.

On June 13th, I observed that a few of my Martin nests contained eggs, but by far the greater number of birds were still endeavoring to build. Of a total of about seventy pairs which had arrived by June 5th, only forty pairs remained to bring out broods. In the house (Style No. 1, see Fig. 6) erected for Supt. Bower on the W. & W. Railroad plot, only one brood was brought out, although four nests were finished in it. In this case, however, the non-breeding birds did not seem to leave the community, but were frequently at the house. In one of the halftone cuts, showing this house, the reader will note six birds upon the roof and veranda.

Mr. Thomas H. Wilkinson, Attorney at Law, Waynesburg, put up one of our houses (See Fig. 7) on May 6th, and had good success, six pairs taking up quarters. His residence is three miles from the city and about a mile from the nearest Martin colony.

So far received reports show that about sixty per cent. of the Martin houses put up during 1910 were occupied by breeding birds, while a large number of others report their houses occupied by Martins that did not nest, but remained at the houses throughout June and July. Quite a number of the houses were put up too late to insure breeding birds this year, but at several of these bunches of non-breeding birds took up quarters, thus insuring early tenants next year, and swelling the per cent. of occupied houses this year.

Only a few persons report no Martins having been seen at their new houses, but two of these rejoice because White-bellied Swallows located in them. Another bought a Style 9 house expressly for the Bluebirds.

I would recommend, however, the single room nest-boxes for Bluebirds and Wrens. The Swallows will colonize to the extent of a few pairs.

The Bluebird prefers an elevation from six to ten feet, and if properly placed the birds will keep to their own box, although the same may be quite near the Martins. My Bluebirds raised two broods (9 nestlings) this year, in the single room boxes, but never did they molest the Martins.

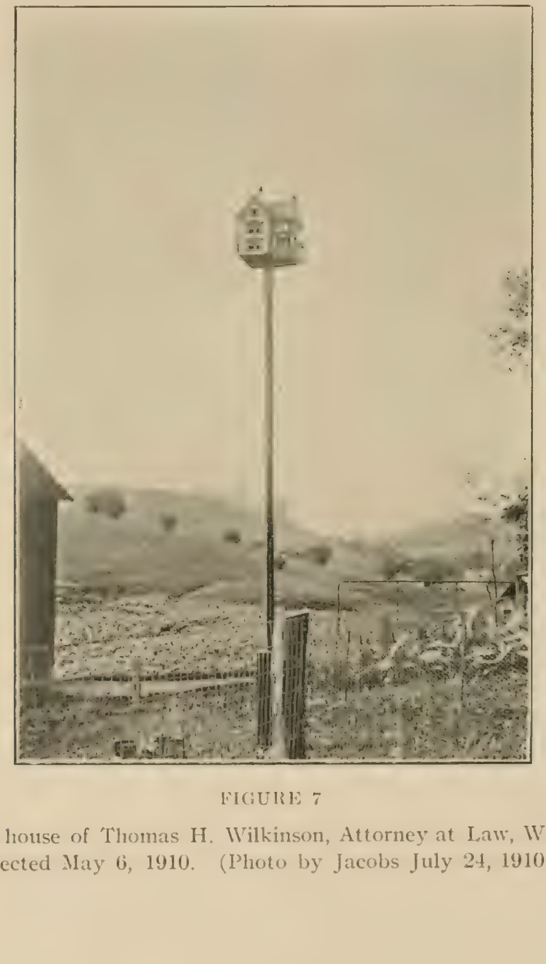

FIGURE 7

Style 7, Martin house of Thomas H. Wilkinson, Attorney at Law, Waynesburg, Pa., erected May 6, 1910. (Photo by Jacobs July 24, 1910.)

Interest in the Purple Martin Increasing

With a slightly increased advertising field, during 1910, requests for bird-house catalogues more than doubled, and likewise the sales of Martin houses increased nearly one hundred per cent. A few of these houses went to persons who bought Martin houses last year, and who wished to provide for an increasing colony. Others were ordered in duplicate for neighbors and friends.

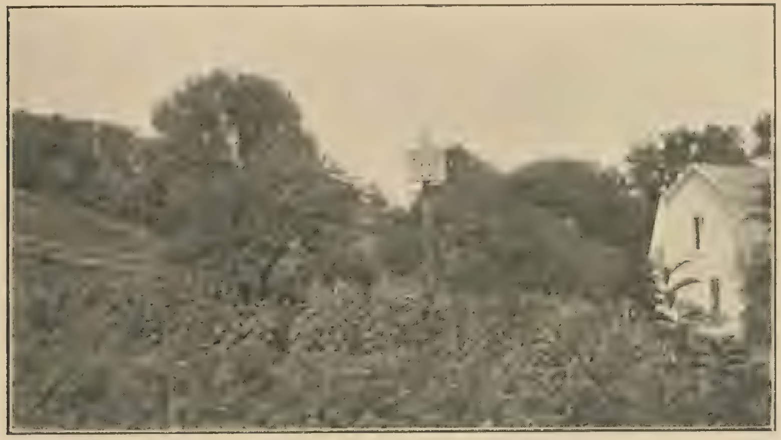

FIGURE 8

Style No. 1 house of F. M. Brooks, President of the Matchless Brass M'f'g Co., Brooklyn, N. Y., erected on his summer residence grounds, forty-two miles from New York City.

An ideal place for a Martin colony; and one in which the atmosphere will be cleansed of mosquitos, and the gardener and fruit grower will receive silent but positive assistance from these valuable birds. (See Mr. Brooks' letter, page 82.)

The well established fact that the Martins are among the most valuable insect-eating birds does not seem to be very generally appreciated by the fruit grower and agriculturalist. An effort was made to reach these classes through representative periodicals but with very little success.

Inconceivable billions of insect pests are destroyed annually by birds, and yet the claim is justly made that, generally, birds are decreasing while insects are increasing every year.

There is no justifiable reason for this! If one twenty-fifth the effort was made for preservation of bird life, in the rural districts, that is exerted for preservation and reproduction of domestic fowl and other animal life, would not birds be on the increase? We who study birds in the wild state know this would be true, and that a little encouragement to birds would help them to help themselves, and if regarded and treated as essential as domestic animal life, no fears need interpose for abundance of all beneficial species of birds.

Furthermore, it must be apparent to all observing rural residents that it is just as essential to have some agency for curbing the ravages of destructive insects as it is to have water for the stock, or workers to harvest the ripened crops.

The preceding remarks are in reference to birds in general, but it seems the Martins must find their best friends among the towns-people and those who dwell in beautiful suburban homes and country places. A review of the correspondence pertaining to the Martin birds, coming to the Jacobs Bird House Company, shows that a very large proportion of those most deeply interested are of this class. The letter files also contain inquiring correspondence from many persons of national prominence.

The writer deemed it advisable to prepare a list of persons who have purchased Jacobs Martin Houses, that the friends of these fine birds might learn what classes of people show great interest in them. Nor are these bird lovers, as a rule, entirely partial to the Martins, the majority of them having also bought nesting boxes for Bluebirds, Wrens or Swallows.

In cases where a business card or professional title accompanied the correspondence, the same has been noted in the list:*

Adamson, Albert T., Farmer, Waynesburg, Pa.
Black, Frank L., Oil Well Contractor, Waynesburg, Pa.

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*The author of this pamphlet, who is also the President and Manager of the Jacobs Bird House Company, assumed the responsibility of violating the terms of the company by filling Martin house orders for a few supposedly reliable persons who failed to include the required remittance with their orders.

In most cases where this was done, he received fair dealing. However, in two instances no attention has ever been given our repeated requests for settlement for houses ordered by two Pennsylvania citizens of prominence, and sight drafts, sent through our Bank, were returned unpaid.

While the Company's books will always show the standing of these irresponsible parties in their dealings with us, their names have been omitted from this list, as I do

Brewster, William, Ex-President American Ornithologists' Union, Biological Department, Peabody Museum, Cambridge, Mass.

Board of Game Commission, Harrisburg, Pa. (Bought by J. M. Phillips, Member of the Board.)

Brooks, F. M., President Matchless Brass M'f'g Co., Brooklyn, N. Y. For use at his home at Fort Salonga, Long Island, N. Y.

Boyd, J. F., Druggist, Fredericktown, Pa.

Boardman, E. A., (of Bartlett Bros. & Co., Bankers, 60 State St., Boston, Mass.) For use at "Birchwood Farms," Beverly, Mass.

Bower, C. E., Supt. W. & W. R. R. Co., Waynesburg, Pa.

Cooke, A. I., Oil and Gas Operator, Waynesburg, Pa.

Cooke, Wells W., Biological Survey, U. S. Dept. of Agriculture, Washington, D.C.

Church, Charles H., Stockman and Farmer, Rogersville, Pa.

Cain, John, Assistant to Road Supervisor W. & W. R. R. Co., Waynesburg, Pa.

Crosby, Maunsell S., Grasmere, Rinebeck, N. Y.

Conner, Miss M. A., Montclaire, N. J.

Coffin, Mrs. F. A., Orange, N. J.

Delano, F. A., President Wabash Railroad 510 Wellington Ave., Chicago, Illinois.

Donaghho, Walter, Donaghho Company, Stoneware Manufacturers, Parkersburg, W. Va.

Drown, Miss Emily D., Weldon P. O., Montgomery, Co. Pa.

Downey, Frank W., Attorney at Law, Waynesburg, Pa.

Dulaney, Jasper, Merchant, East Waynesburg, Pa.

Dutcher, William, President National Association Audubon Societies, Plainfield, N. J.

Foote, Avery L., Manager Wayne County Milling Co., Newark, Wayne Co., N. Y.

Gunther, Mrs. W. H., Babylon, Long Island, N. Y.

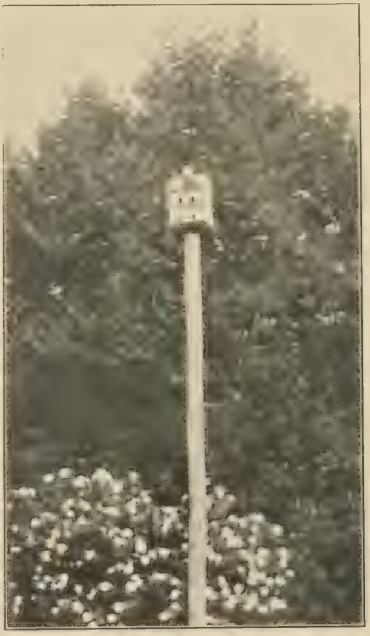

FIGURE 10

Style 9 Martin House of Miss Emily D. Drown, Weldon, P. O., Penna.

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not care to associate the name of a person with this good cause, who undertakes a self-imposed duty of helping the birds by cheating a fellow citizen.

The lesson may teach us to be more stringent in the future, but in the present cases I have squared the unsettled bills with the Company, humbly submit to the imposition by these unreliable purchasers and dedicate the houses to the Martins.

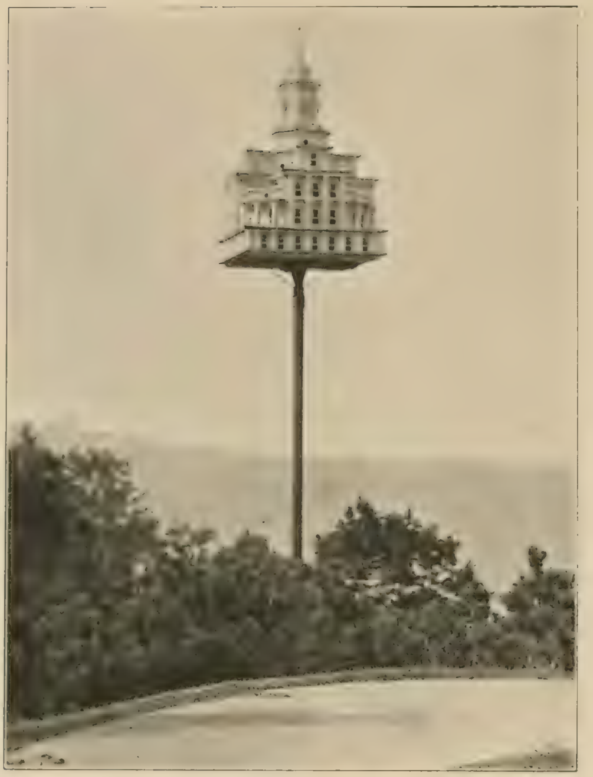

FIGURE 9

The handsome Style 4 house shown in this cut was erected on the Lake Forest residence grounds of Mr. Byron L. Smith, President of the Northern Trust Company of Chicago, Illinois, and while it was erected in ample time, no breeding Martins occupied the compartments this year, although other well established houses on his premises were occupied. All his old houses, however, are on fifty foot telephone poles which may account for the birds ignoring the new house at a lower elevation. It is more probable, however, that his old houses were not over-crowded, in which event no Martins would be compelled to seek new nesting quarters.

The author of this pamphlet has a Style 4 house, erected in the spring of 1904, which has always been a favorite with the Martins. The elevation of this house is seventeen feet above the ground, and the first occupants were the former tenants of his Style 1 house in which the colony was established in 1896.

Gallun, Mrs. Albert F., Lafayette Place, Milwaukee, Wis. For use at "Woodland," Hartland, Wis.

Hoffman, Mrs. E. A., Pontiac, Mich.

Halsey, Chas. D., (of C. D. Halsey & Co., Bankers and Brokers, Mills Building, New York City). For use at his home at Seabright, N. J.

Hudson, P. K., "Westlook Farms," East Norwich, Long Island, N. Y.

Hansen, Miss Emilie L., Nashotah, Wis. (Now the country place of Wm. Stark Smith, Milwaukee, Wis.)

Inghram, Hon. James, President Judge of County Courts, Waynesburg, Pa.

James, Norman, Vice-President, N. W. James Lumber Co., Baltimore, Md.

Kellar, Dr. Ida A., (High School for Girls, Philadelphia, Pa.) For use at the home of Mrs. George Ziegler, New Hope, Pa.

Lockwood, C. W., Eau Claire, Wis.

Lippencott, Samuel W., (Terminal Warehouse Co., Baltimore, Md.) For use at his residence grounds, "Ruxton," Baltimore Co., Md.

McConway, William, The McConway-Torley Co., Pittsburgh, Pa. For use at his summer home at Torrington, Conn.

Mellon, R. B., Vice-President Mellon National Bank, Pittsburgh, Pa.

Millikin, T. N., M. D., Waynesburg, Pa.

Moseley, Carleton, Highland Park, Lake Co., Ill.

McMillin, Joseph M., Carnegie Steel Co., New Castle, Pa.

Mott, Miss Marion, Radnor, Delaware Co., Pa.

Osborne, Miss Josephine F., Auburn, N. Y.

Osborne, Mrs. E. W., Auburn, N. Y.

Partridge, Newton L., Princess Anne, Md.

Patton, Joseph W., Attorney at Law, Waynesburg, Pa.

Patten, Edwin, Provision Merchant, Rockville Center, Long Island, N. Y.

Pack, Charles Lathrop, Lakewood, N. J.

Parker, Edward L., Concord, Mass.

Parmly, E., Red Bank, N. J.

Perry, George P., Druggist, Sterling, Ill.

Peterson, S. J., Chicago, Ill. For use at his summer residence, East Troy, Wis.

Phillips, John M., Pres. Phillips Mine and Mill Supply Co., Pittsburgh, Pa.

Phillips, John C., Boston, Mass. For use at "Moraine Farm," Beverly, Mass.

Piel, Mrs. M., 245 W. 72nd St., New York City. For use at her summer home, Jackman, Maine.

Purman, J. J., Attorney at Law, Waynesburg, Pa.

Putnam, A. S., Druggist and Jeweler, Manistique, Michigan.

Ramage, S. Y., Oil City, Pa.

Reese, John T., Farmer and Miller, Waynesburg, (R. F. D.) Pa.

Robinson, Daniel C., Boston, Mass. For use at his summer residence, Manchester, Maine.

Rogers, J. T., Druggist, Waynesburg, Pa.

Russ, Edward, State Board of Education, Hoboken, N. J.

Rockwood, Mrs. G. I., Worcester, Mass.

Richardson, George H., Old Town, Maine.

Rathvon, William R., Chestnut Hill, Mass.

Rockefeller, William, President Standard Oil Co., 26 Broadway, New York City. For use at Tarrytown, N. Y., and at Bay Pond, Franklin Co., N. Y.
Smith, Samuel M., Attorney at Law, Waynesburg, Pa.
Smith, Miss Cora A., Biological Department, Erie High School, Erie, Pa.
Smith, Bryon L., Pres. Northern Trust Company, Chicago, Ill.
Smith, Miss Eunice, "Elm Ridge," Alton, Ill.
Sayers, A. H., Attorney at Law, Waynesburg, Pa.
Shriver, F. M., Ex-County Recorder of Deeds, Waynesburg, Pa.
Smith, Elmer I., Editor "Warren Journal," Belvidere, N. J.
Sharples, P. M., "Sharples Separator Co.," West Chester, Pa.
Sperry, Lewis, Attorney at Law (Ætna Insurance Building, Hartford, Conn.) East Windsor Hill, Conn.
Troutman, P. A., District Superintendent, Carnegie Gas Co., Waynesburg, Pa.
Thompson, Charles, Wholesale Junk Dealer, Waynesburg, Pa.
Trumbull, J. H., "Trumbull Electric Mfg. Co.," Plainville, Conn.
Trench, D. G., 5 Wabash Ave., Chicago, Ill. For use at Oak Park, Ill.
Upson, Dr. Henry S., 10908 Magnolia Drive, Cleveland, Ohio.
Wilson, J. H., Attorney at Law, Belvidere, N. J.
Wheat, Mrs. Emilie A., Geneva, N. Y.
Wales, Arvine, Treasurer Russell Engine Co., Massillon, Ohio.
Wheeler, Mrs. Clara R., Nashua, N. H.
Wilkinson, Thomas H., Attorney at Law, Waynesburg, Pa.
Williams, Richard F., 14–16 Park Place, New York City. For use at Ticonderoga, N. Y.
Wheelwright, Mrs. A. C., Mt. Vernon St., Boston, Mass. For use at Lincoln, Mass.
Way, W. Scott, "The Sycamores," Easton, Md.

Summary: One hundred and five Martin Houses, mostly of the medium sizes and styles, to eighty-seven individual purchasers, residing in fourteen different states.

In going through the reports sent in by Martin-house purchasers I have selected several for submitting here, which show a variety of experiences with the birds and the miniature houses provided for them. Especially have I drawn on those having the greatest success, to show what may sometimes be anticipated, when the Martins come and find conditions to their liking.

It is not so easy to establish new colonies of House Martins as it is to maintain the colonies, once the birds establish themselves.

Mr. James' letter, herewith submitted, suggests this fact. The extra house he bought, however, may become a great Martin success the second year. Martins will eventually take up quarters in it.

BALTIMORE, Md., August 15th, 1910.

MR. J. WARREN JACOBS,
Waynesburg, Pa.

Dear Sir:

I have yours of the 12th inst., and in reply beg to say that I am having very good luck with my new Martin-box. This box, by the way, took the place of an old box which had always been occupied. The extra box which I ordered from you I gave to my brother, who was not successful in landing a colony this year. Possibly he was late in getting it put up.

Yours very truly,

NORMAN JAMES.

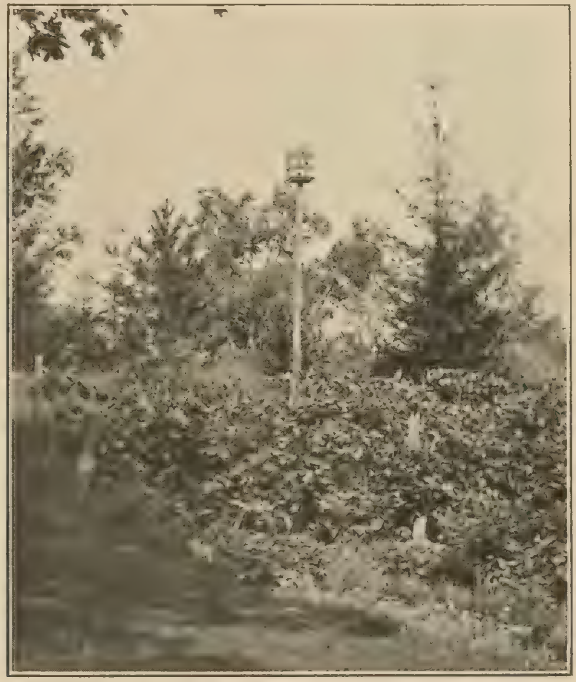

FIGURE 11

Style 9 Martin House of Mrs. Albert F. Gallun, "Woodland," Hartland, Wis.

FREDERICKTOWN, Pa., October 19, 1910.

MR. J. WARREN JACOBS,
Waynesburg, Pa.

Dear Sir:

The bird-house which I purchased from you this last spring was intended to supplant an old one which had been on my grounds for several years past, but which had become somewhat dilapidated. The question was, whether the Martins would take up with the new house after it was erected. And I must say that the results were very gratifying indeed, as I believe that this season I have had more Martins than ever before. I have counted 21 birds on the house at one time, and while it is impossible for me to state with any certainty how many nests were built, I am sure that there could not have been less than ten or twelve. It is an ornament to my place, and has attracted much attention from people who pass by. Very truly,

JOHN F BOYD.

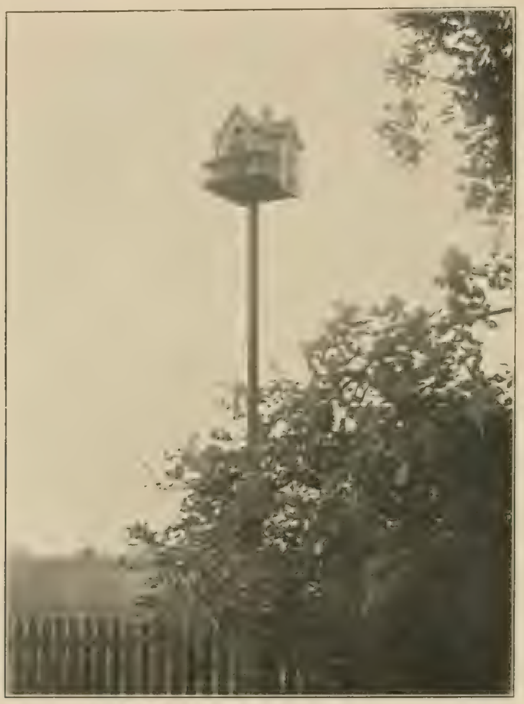

FIGURE 12

Style 6 House of Mr. Walter Donaghho, Parkersburg, W. Va.

The following letter from Mr. Donaghho shows what may be anticipated, at a new house, after the birds once establish themselves.

Mr. Donaghho was among the first to purchase Martin houses in 1909, the same being erected early in March, but there being no established colonies in his section, he patiently awaited wandering Martins to locate it. The month of June was half gone before any Martin prospectors came. Two were there at first, but in a few days more came. One brood was raised, but the lateness of the season, or some other cause, prevented the others from nesting. But these birds had the house located, and undoubtedly settled on it for a permanent summer home, for they returned there last spring, eight pairs taking up quarters and rearing broods.

These eight pairs probably brought out thirty young birds this year, and when they all return next spring Mr. Donaghho will witness an overflow, or surplus of birds endeavoring to gain summer quarters in his seventeen room house. Those fought off by the birds already in possession will seek elsewhere for nesting-boxes, and if found early will nest, otherwise they will merely locate a new house and make constant visits to it.

PARKERSBURG, W. Va., September 10, 1910.

MR. J. WARREN JACOBS,
Waynesburg, Pa.

Dear Sir:

This is now the expiration of the second season for the bird-house purchased from you (Style 6) and it has been a satisfactory one in every particular. The first Martins came to the house April 14th, and from that date until the first week in August they enlivened and amused us with their cheerful company. As I stated in a former letter, but one pair nested in the house last season, but there were at least eight pairs this season. I am sure now that they are permanently established, and I am very much gratified at the result of my experiment.

In this connection I wish to express my thanks for your courtesy shown me during my call at your residence and place of business last July. I would not have missed seeing your scientific collection of birds' eggs for anything, which far surpasses anything of the kind I ever saw.

Wishing you success in your business, and a larger sale than ever of your famous bird-houses next season, I remain Yours very truly,

WALTER DONAGGHO.

Mr. Newton L. Partridge, Princess Anne, Md., whose report appears in the First Supplement, had seven pairs of Martins to nest in his ten room house last year, and foresaw the need of another house to take care of the surplus birds returning last spring. Being away at college when the new house arrived, it was not put in position, and the birds not gaining entrance in his first house, went elsewhere to nest. Under date of July 9, 1910, he writes that eight pairs of Martins nested, the other two rooms being occupied by English Sparrows.

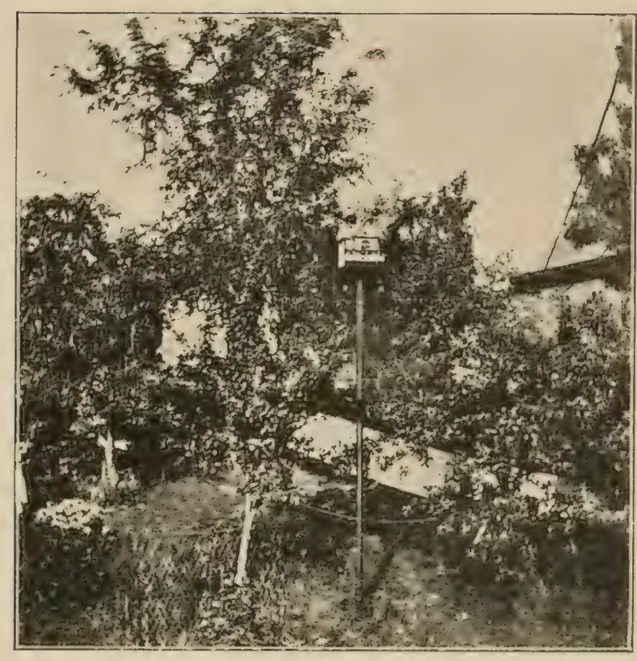

FIGURE 13

Style 6 Martin House of Mr. Geo. H. Richardson, Old Town, Maine.

Good success in Maine!

Mr. George H. Richardson, Old Town, Maine, bought a Style 6 Martin House last March, and under date of July 8th writes of his success:

"The Martin house bought of your firm is a great success. I think every room is occupied; there being one family of Wrens, one of English Sparrows and the balance of Purple Martins. There is an occasional quarrel between the Sparrows and Martins, but the Wrens seem to attend to their own affairs and to be free from molestation from the other varieties."

Later: From a letter dated September 6th, I submit the following extract: * * * * * "The colony (of Martins) deserted the house on August 12th; however, one family of two stayed two or three days later, while another mother bird was obliged to feed a backward youngster several days longer. The Martins are in the vicinity now, or were very recently, flying about in large flocks. I am well pleased with the result of my first year's experiment." Yours very truly,

George H. Richardson.

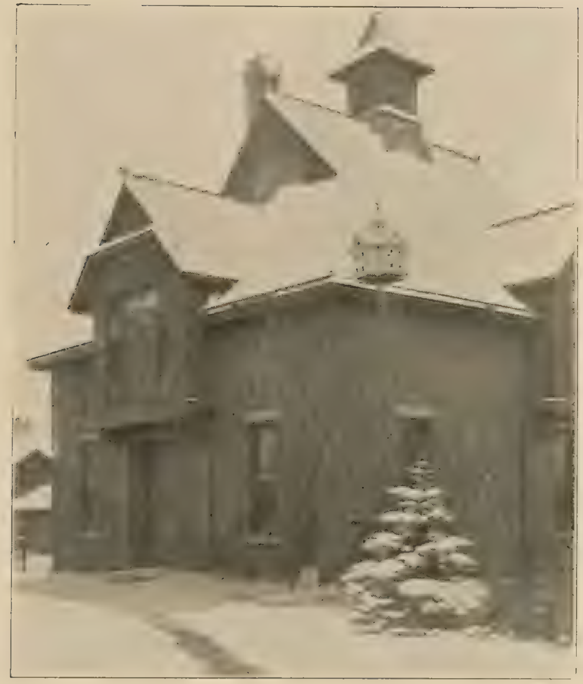

FIGURE 13A

Silent sentinel to breast the bleak wintry winds and sifting snow. A refuge for tiny whistling zephyrs and swirling nymphs until Springtime's fragrant, softening breath drives to Boreal Land, Old Winter's blasts, and bids welcome to our affectionate friends,—the Martins.

Style No. 1 Martin house of C. W. Lockwood, Eau Claire, Wis. From a photo taken after a fall of snow in October 1910.

EAU CLAIRE, Wis., October 29, 1910.

MR. J. WARREN JACOBS.

Dear Sir:

I have been abroad since June 1st, and have just returned. My coachman says that eight Martins came about June 15th, and remained the balance of season.

Our fire departments, for many years, have had large colonies at three different hose houses, and at the advice of the Fire Chief I removed the house from its first location near a large tree to a more open space, near the stable on the river bank. The Martins which came were seen by the Fire Chief, so I think my man was not mistaken.

* * * * * *

Respectfully,

C. W. LOCKWOOD.

Belvidere, N. J., June 8, 1910.

Mr. J. Warren Jacobs,
Waynesburg, Pa.

Dear Sir:

Believing you would be interested in learning of our success with the No. 5 Purple Martin house I purchased from you this spring, I may say that our most sanguine expectations have been more than realized, as we now have about thirty Martins and they are busily engaged in gathering nesting material. The box was erected on a pole about 25 feet from the ground and the sparrows have given but little trouble. This being our first year to get a Martin colony started here I am inclined to believe we have been unusually successful.

Our town is located on the Delaware river and I am inclined to think these birds show a preference for localities along such streams. Portland, a town about 12 miles north, for years has had quite a large colony. But perhaps the largest Martin colony in this part of the state is at Blairstown, 16 miles northeast of us, this having 500 or 600 of them.

We erected our bird-house on one of our prominent street corners and the lively chatter of the birds and their very interesting habits make them objects of great interest to all. I may say that for the first three weeks after putting up our house we were beginning to get just a little discouraged because no birds appeared. Then one morning a lone Martin, a male—as black as a crow,—came. He remained several days and then disappeared for a day or two, when he returned with two females. A week or so later, a dozen more came and then the others.

With the young birds hatched this summer we confidently look forward to a greatly increased colony next spring.

Yours very truly,

Elmer I. Smith.

LATER.—About fifteen pairs nested in the house the past summer; so you see our first season's experiment was a success. Our bird-house is over a concrete pavement, and we lost several young birds which fell down from their nests. * * * * *

Our fine colony, the past season, created much interest, and next spring we look forward to a material increase in their numbers.

Thanking you for your inquiry, and with best wishes to you in your work for bringing these most interesting birds to new localities, I remain

Yours truly,

Elmer I. Smith.

I submit below Mr. Samuel W. Lippencotts' letter in full. Here is a case which shows forcibly what may be expected if the English Sparrow is allowed to fortify himself in a new house, before the arrival of the Martins. However, had the Martins arrived earlier, Mr. Lippencott could have succeeded in disposing of the Sparrows in time for the Martins to nest. These Martins reaching his new house, late in

June, were a bunch driven away from their former home, which had become crowded, or were discouraged from nesting in the home-box by unfavorable conditions. In their wandering over new territory, they have located Mr. Lippencott's new bird-house, and although too late to breed this year, they will return there early next spring.

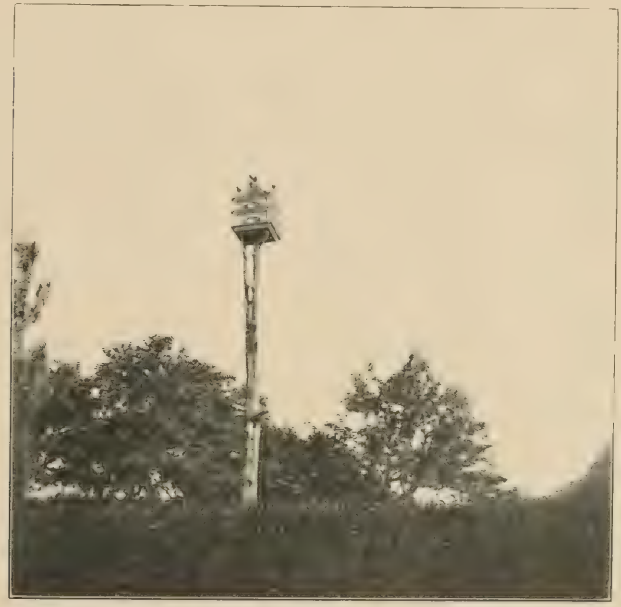

FIGURE 14
Style 9 House erected on dead tree stub. Samuel W. Lippencott, Baltimore, Md.

BALTIMORE, Md., August 8, 1910.

MR. J. WARREN JACOBS,
Waynesburg, Pa.

Dear Sir:

I obtained a Martin house from you this spring and erected it about the first of April in anticipation of a flight of Martins such as I have noticed in former seasons; but they did not repeat the performance and I concluded that I would have to wait another year, since there is, to my knowledge, but one colony anywhere near from which I could expect some outcasts.

A sparrow took possession of an attic apartment, and as she and a Mrs. Wren were the only applicants, I didn't take time to exercise my influence in favor of the latter.

About the middle of June a Martin visited the house and was promptly pounced upon by tenant; but nevertheless the stranger paid two more visits during the day, always meeting with a disagreeably warm reception. I pulled out the sparrows' nest with eggs and hoped to establish a peaceful summer resort, but with tremendous energy, equal to a good many pounds of pressure per square inch, the pair promptly began rebuilding. The Martin returned several times daily and within a week or ten days brought two other seemingly young birds to see the establishment. They inspected several chambers and twittered very sociably when inside or out, although the cock sparrow sought help among his fellow bandits and brought several of them to assist in banishing the strangers.

I tried to shoot the trouble-makers but they would alight on the far side of the house and hang their heads down underneath it just far enough to keep an eye on me without affording me a target. Again I threw out the nest but with the same result as though I had thrown a rubber ball against a wall—they were back immediately with all sorts of building material.

The Martins continued their daily visits and ultimately numbered six but they showed no disposition to nest and about the middle of July their visits ceased altogether.

Do you think I can confidently expect this same delegation to take possession next spring?

I enclose a photograph showing four of them upon the house.

Very truly yours,

SAM'L W. LIPPENCOTT.

Miss Josephine F. Osborne and her aunt, Mrs. Eliza W. Osborne, Auburn, N. Y., bought two Style 6 houses, one for replacing an old house, and the other for erecting on Mrs. Osborne's grounds, to entice the birds there.

Their very interesting letters, describing their success, follow:

AUBURN, N. Y., July 11, 1910.

Dear Mr. Jacobs:

The houses came in good shape, and the one that was to take the place of the old house on Garden St., which must have been there for thirty years or more, was put up on the 14th of April. The next day, one male Martin was seen looking around the house, and the day after that there were seven or eight. Now they are established and brooding, I think. I have not been down there to make observations for some time.

You can imagine my great pleasure to find they had accepted the new house without a murmur, so far as any of us observed.

Two or three days after the house on Garden St. was occupied, you can fancy my surprise and pleasure to hear, early one morning, the calls and whistling of two or three Martins here on my Aunt's place, looking over the other house, which Mrs. Osborne had put on her grounds. They also came to stay, others joining them later, so that now there are about eight birds nesting. I think the birds that have taken up with the house here, on my Aunt's ground, are supplied from last year's overflow of young at the old house on Garden St.

Just to think that all these years have gone by, when we might have had swarms of

Martins, had we only supplied the birds with houses. The sparrows have bothered the Martins some, but their nests are destroyed as often as they are finished and eggs laid.

The thing I dread most is owls. A pair of old owls are flying around, evenings, with their young. I am afraid, later on, they will be hauling out the Martins in the manner you describe.

Yours sincerely,

(MISS) JOSEPHINE F. OSBORNE.

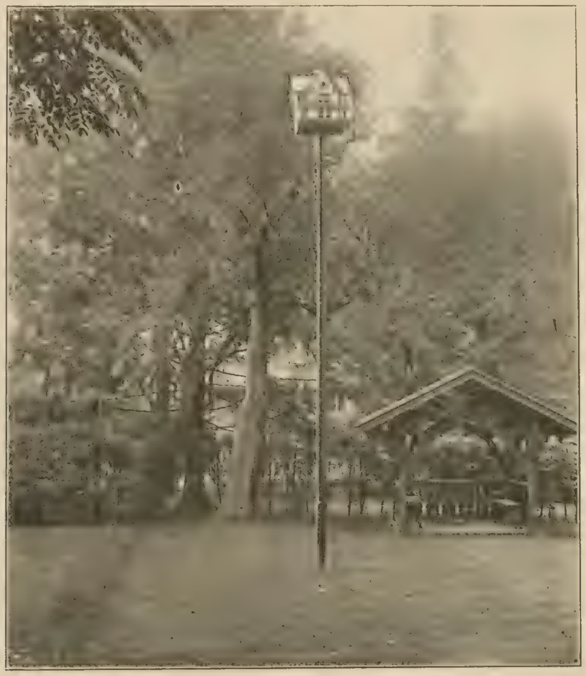

FIGURE 15

A suggestion of cool, refreshing air, tinkling melodies of tree-loving warblers and the liquid babble of our purple friend, the Martin. Seventeen room Style 6 Martin Home of Mrs. Eliza W. Osborne, 99 South St., Auburn, N. Y.

99 South St., AUBURN, N. Y., June 29th, 1910.

MR. J. WARREN JACOBS,
Waynesburg, Pa.

Dear Sir:

After reading your little pamphlet called Gleanings No. 5, in regard to the Purple Martin, I thought perhaps you would like to hear of an experience I have had. I enclose photograph of the house with one Martin seated on the top of it. I wasn't able to find the Martin but believe it is there. I am happy to say they came about the middle of April. I did not put down the exact date, for which I am sorry. Just two or three came at first and gradually the number increased until shortly after there were seven nests thoroughly completed, perhaps with eggs in, and two that were being made. The sparrows immediately took possession of one part of the west side and made their nests in two of the compartments, evidently judging they were put up for them as well as the Martins, and the latter did not seem to mind them very much, although my niece saw a sparrow grab a Martin by his bill as it was quietly sitting on the nest. I have had the sparrows' nests taken out as soon as they had laid two or three eggs. Finally the last one had five eggs in when I had it taken down and they became discouraged and did not trouble to build any more.

The man who attended to that part of the business thought he would look into the Martin nests the last time he went up for the sparrows; just glance in and see if things were all right, and he found in one of the nests a dead Martin, a male, which was still warm, had no mark on it whatever to show the cause of its death, and it is a perfect mystery unless it is possible that the sparrow may have got hold of the bill again and smothered it, at any rate, his death is a fact,—perhaps you can solve it.

Of course it was taken out of the nest and the next day the birds seemed to be having a great time over something, chattering away, flying around and around much disturbed, but they finally settled down. I am watching impatiently to see when the young Martins appear. Of course I do not like to interfere with them oftener than necessary to see what is going on in their compartments, and as long as the sparrows have decided to let them alone it isn't necessary to examine the nests. It has been a great delight to have them. I have always wanted them but the house I put up for them formerly, which I had made by a carpenter, did not seem to suit them and they never came. I selected the place very carefully, partly in the shade but still away from the branches of trees, and it is very delightful to hear their liquid notes as they fly back and forth or chatter to each other as they are quietly standing on their little balconies. I wondered if I put up another house some little distance away in another part of the grounds whether another family would come. Would you advise my putting another one up? I would like very much to have any little pamphlet that you have published in regard to birds, and if you will send me what you have and let me know the price I will be glad to forward the amount. I have informed a number of my friends about the houses you make and several of them intend to get them for next year.

Later—July 21st. I have just returned from a two weeks visit and my gardener tells me that while I was away my man got up to the nests and found only three left with birds in of the seven and two partly built ones, the other four had been taken clean out of the little house as if regular house cleaning was going on, not a trace of the nests are left, neither was there any of them left on the ground at the foot of the pole.*

Very cordially yours,

(Mrs.) Eliza W. Osborne.

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*Nothing unusual to find two or three old birds dead during the summer, where a colony consists of several pairs.

The mystery of the disappearance of the nests, mentioned by Mrs. Osborne, is not

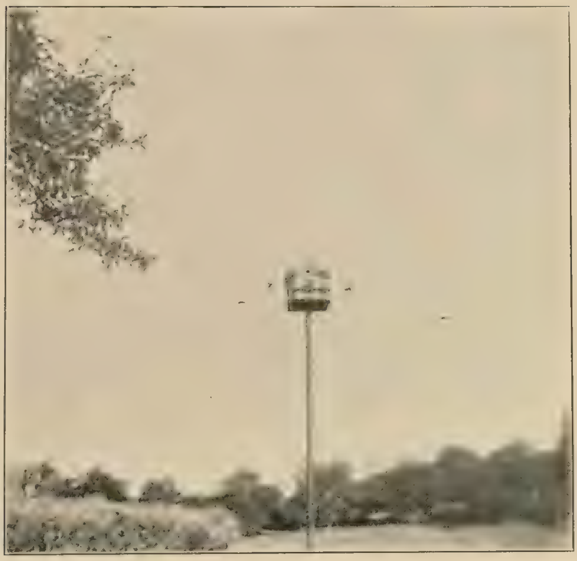

FIGURE 16
Style 6 House ordered by Dr. Ida A. Kellar, High School for Girls, Philadelphia. Erected on the grounds of Mrs. George Ziegler, Aquetong, Bucks Co., Pa.

Aquetong, Bucks Co., Pa., October 12, 1910.

My dear Mr. Jacobs:

Replying to your communication: We are located about three miles from the Delaware River west of New Hope. The Martin house purchased from you was erected in March but the birds did not materialize until the latter part of May when some few were seen but they did not locate. June 5th a number took possession of the house and a short time later it was fully occupied (seventeen apartments) not, however, until

easily explained. Martins sometimes remove their nesting material from one room to another. Also, I might add that the birds sometimes steal nesting material from one another.

Some of the birds may have been discourged or interrupted by weather conditions, and given up nest building duties, and allowed their nest material to be removed by their neighbors.

Mrs. Osborne's Martin house, of seventeen rooms, should furnish ample room, the second year, for the increase of the colony, but to retain the overflow or surplus young, which will with favorable conditions be raised in 1911, an additional house will be needed in 1912.

a fierce war had been waged with the Bluebirds. The Martins won out. Young birds were raised and about the last week in August all took their flight, much to our regret. Enclosed is a snap-shot. I am pleased to say the venture was a great success.

Yours truly,

(Mrs. George) Emma V. Ziegler.

Brooklyn, New York City, July 11, 1910.

Mr. J. Warren Jacobs,
Waynesburg, Pa.

Dear Sir:

Replying to your circular letter regarding the Purple Martin house purchased from you this spring, I would state that it was put up about the end of April at Fort Salonga, Long Island, N. Y. This is where I reside in the summer and it is about 42 miles from New York on the north shore of Long Island.

There are no Martin houses anywhere within miles of the locality so far as I know. I have failed to observe any Martins in that locality, although I have lived there for several summers. I had about given up the idea of seeing any Martins this summer, when on the 14th of June one male and two females appeared. Since then another male has arrived so that there are two pairs living in the house.

The location of the place is particularly favored by song birds, owing to some springs near by, which always provide water. This is rather unusual on the north shore of Long Island. We are located about one-half mile from the Long Island Sound. We are rather pleased to think that we have been so successful in getting the Martin colony started the first year the house was put up.

I enclose photograph of the house, and would state that it is located about one hundred feet from the residence and about the same distance from the barn, on a pole 15 feet high.

Yours very truly,

F. M. Brooks.

See Fig. 8 for halftone reproduction of Mr. Brooks' bird-house.

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64 Court St., New Castle, Pa., August 25, 1910.

Mr. J. Warren Jacobs,
Waynesburg, Pa.

Dear Sir:

The No. 7 Bird-house purchased from you this spring was placed in position about April 1st. We did not see any birds for two or three weeks until one morning a pair of them came and made a thorough examination of the house. They appeared on two other occasions at intervals of a week or ten days. One morning about the middle of May there were four pairs looking around the house, and one pair settled in one of the rooms off the porch roof. They started to build but cold weather set in and we thought we were going to lose them. However, as soon as the weather got good they started again on their nest.

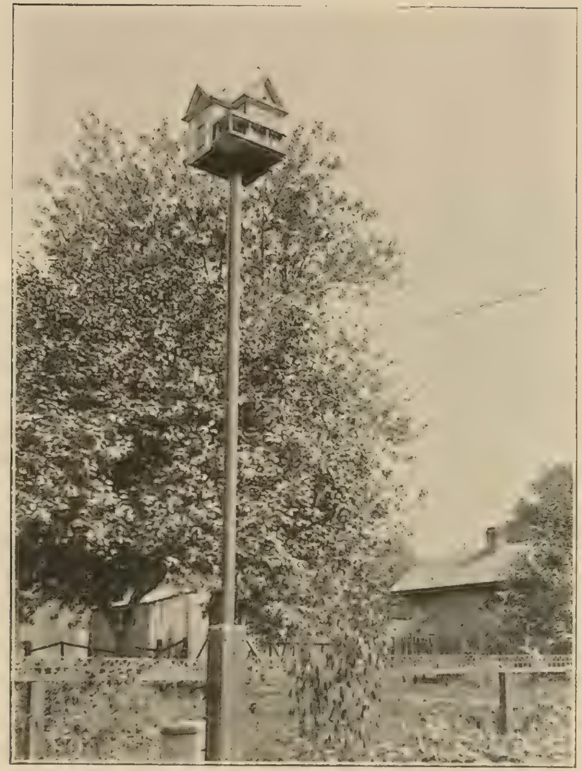


FIGURE 17

Style 7 House of Jos. M. McMillin, (Carnegie Steel Company) New Castle, Pa.

This pair raised some young ones and they left the nest about ten days ago. After the first pair began to build there were always fifteen or twenty Martins around the house and they kept quite lively. There were three other pairs which seemed to be building but do not believe they finished. The weather was very bad about the time the birds were due and we had about given up hope of having the house occupied this season. Judging from what I have read in some of your articles we will be sure of some birds each year now.

Our property is located on a corner and there are street cars passing within a few feet of the bird-house every few minutes. After the birds got settled they became very tame and do not pay any attention to any of us now. A pair of Wrens built in one of the two rooms in the rear of the house and raised a family. The Martins and Wrens did not seem to have any trouble, although when the Wrens were absent the Martins would peep into their nests. The sparrows made some trouble but the Martins always succeeded in driving them away.

I am enclosing a photograph of the house.

Yours very truly,

JOS. M. MCMILLIN.

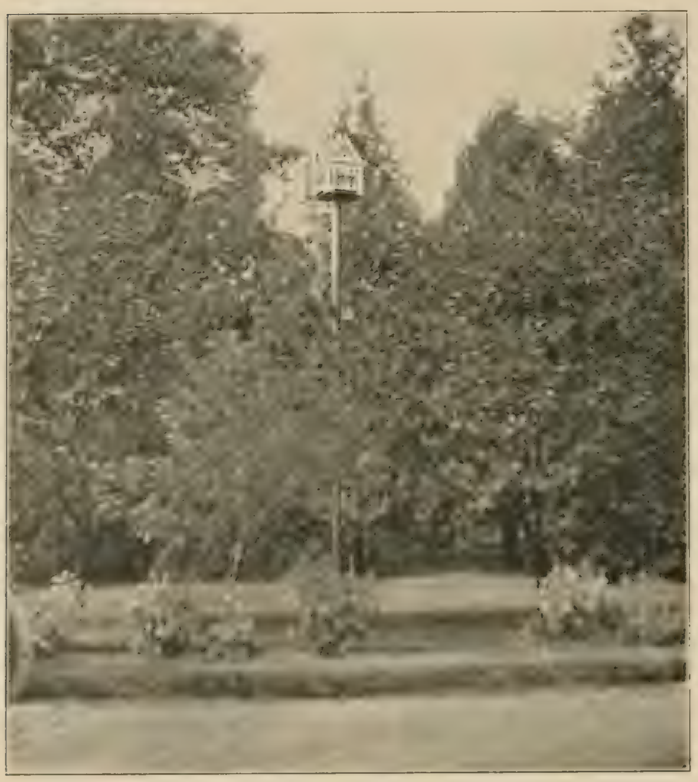


FIGURE 18

Style 10, Martin House (20 rooms) of Miss Emilie L. Hansen, "Buen Retiro," Nashotah, Wis.

In providing nesting-houses for the Martins, it is better to be late than to never make the attempt.

Here is Miss Emilie L. Hansen of Milwaukee, Wis., who ordered a Style 10, 20 room house in June for their country place, "Buen Retiro," Nashotah, Wisconsin. The house was erected June 23rd, and in a few days Martins visited it, and continued to temporarily live at the house up to the date of her report, July 14th.

Since it requires eight weeks—or longer,—for a pair of Martins to build their nest, incubate eggs and care for the nestlings, we can scarcely expect any of them to start household duties after July 1st, and, in fact, few of them will venture to build their nests after June 20th, and I might also add, that many discouraged pairs give up nesting even before this date.

In the present instance, as well as others, where the Martins have arrived late, but did not attempt to nest, it is safe to say that these birds will return to the new location, early next spring, to breed.

"BUEN RETIRO," NASHOTAH, Wis., July 14, 1910.

J. WARREN JACOBS,
Waynesburg, Pa.

Dear Sir:

The bird-house we received from you went into position the 23rd of June. The 25th the Martins showed themselves—a pair of them—and they would fly around the house and finally alighted about the 27th. The sparrows almost immediately began to build their nests in the house but by persistance we have kept the house clean. The Martins came every morning and evening, sometimes only females, then again one male with the females. Yesterday one male and female were here almost continually all day. This morning two males and two females took possession and the sparrows are laying low. Do you think they will still build this year? It is rather too late, isn't it?

Very respectfully yours,
(MISS) EMILIE L. HANSEN

Mrs. M. Piel, New York City, bought a Style 2 Martin House for her summer home at Jackman, Maine, who undoubtedly missed having the Martins to nest by the negligence of the overseer to put the house up in time.

"LAKE PARLIN," JACKMAN, Me., August 19, 1910.

MR. J. WARREN JACOBS,

Dear Sir:

I intended to inform you of our experience with the nice Martin house you sent to us this spring, but we were disappointed.

When we came here, the first week in June, the bird-house had been erected only a few days before.

Our men were reminded to put up the house by seeing a number of Purple Martins, probably on a search for summer houses.

About the 20th of June a single Martin—almost black—was seen perched on the bird-house. He entered every room and we noticed him for three days, in the forenoons. We were in hopes the bird would bring his mate and friends.

On the 8th or 9th of July two Martins appeared, but remained only two days.

We are disappointed, but not discouraged—the house was erected too late.

I think we have a fine place for the bird-house, it being erected on a high post on the lawn, surrounded by buildings, open toward the south. We have no sparrows and will not allow them to stay, if they should try to come from our nearest town—Jackman—where they are plentiful. We are situated on a high altitude, between high mountains, in the most northern part of Maine, and about thirty miles from the Canadian Line.

We have heard that the nearest Martin colony is about sixty miles south of us. We hope, nevertheless, to get the Purple Martins to make their homes with us next summer when my children can take snap-shots of them for you.

Our interest in the Purple Martin remains, in spite of our failing to have them this summer.

I thank you for the copy of "Gleanings" you sent me, and will always be glad to learn of other people's success with the Martins."

Very truly yours,

MRS. MICHAEL PIEL.

Here is a pretty effect in mounting a Martin house on the top of a dead tree stub, with vines and flowers growing around the base.

Poles of this sort should be provided with a broad band of sheet tin, tacked around it seven or eight feet above the ground, to protect the occupants of the house from attacks by snakes, or cats, squirrels and other destructive enemies.

Following Mrs. Gunther's letter is the report of W. Scott Way, which should be read by persons having Martin houses erected on wood poles, without means of protection.

BABYLON, L. I., New York, July 15, 1910.

MR. J. WARREN JACOBS,

Dear Sir:

I am very pleased to tell you of my experience with the little bird-house. It was safely received and put in place, and the Martins anxiously looked for. But none arrived for many weeks, and in the meantime the sparrows had taken full possession.

After giving up all hope of any Martins this year, one morning there was a great commotion, and there were two Martins fighting for the house. The Martins finally taking the upper part of the house, and the sparrows the lower floor.

There are now about six pairs and they all live in peace, each pair keeping to their part of the house. They are a great pleasure, and I only wonder why more people do not try to get the birds around their homes.

Very truly,

(MRS.) W. H. GUNTHER.

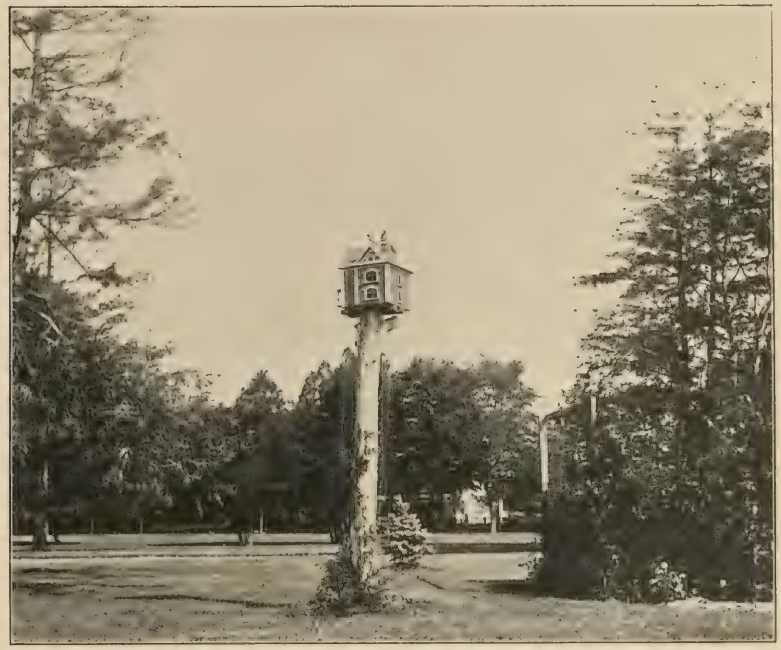


FIGURE 19

Style 7, nineteen room house of Mrs. W. H. Gunther, Babylon, Long Island, N. Y.

EASTON, Md., August 19, 1910.

MR. J. WARREN JACOBS,
Waynesburg, Pa.

My dear Sir:

Replying to your favor of recent date will say that my attempt to attract a colony of the Purple Martin was successful, but unfortunately was attended in the end with something of a tragedy.

The beautiful house I ordered of you was erected in April, on a pole, about 18 feet from the ground, and was watched with much interest. Two pairs of English Sparrows took early possession and these drove away several pairs of Bluebirds that a few days later made an attempt to occupy rooms in the house. On May 20th three pairs of Martins came and inspected the house, and later in the day returned with others. May 30th twelve Martins were counted on or about the house and several were observed to be carrying nesting material. Fearing that I might disturb or alarm the Martins I made no examination of the nests. Two young birds were observed to leave the house on July 20. Others might have come out earlier and escaped my notice. On July 26

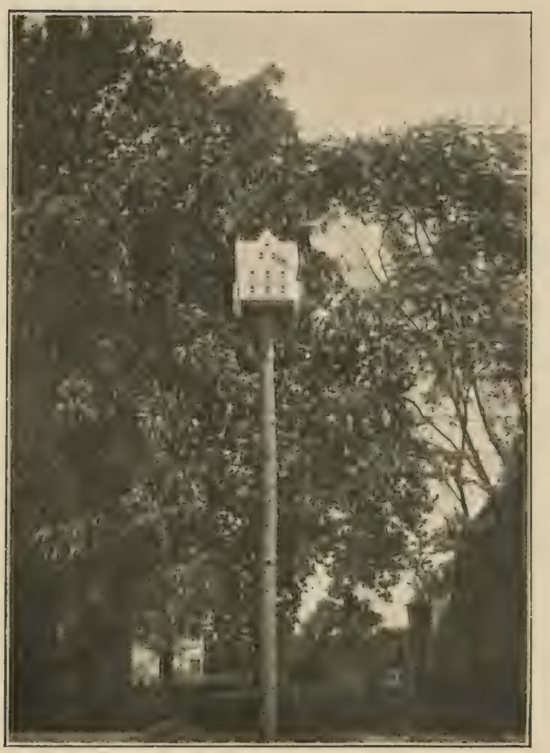


FIGURE 20

Style 5, twenty-eight room Martin home of Mr. W. Scott Way, at "The Sycamores," Easton, Md.

Twice within a few days this pole was ascended by large black snakes, many of the nestlings falling victims of the serpents.

I noticed a state of great excitement at the Martin colony and, looking closely, was surprised to see a large black snake coiled on one of the lower platforms of the house with his head in one of the holes. Before I could reach him by means of a ladder he had entirely disappeared in one of the rooms. I punched him out in short order and on cutting him open found he had just swallowed two young Martins almost fully fledged. The snake measured over four feet in length.

I had no idea that a snake could reach the Martin house and I now, though at too late a day, ordered a "snake arrester" in the shape of a large square of sheet tin to place on the pole about eight feet from the ground. Before I could get this, however, I noticed another commotion about the house and again getting my ladder found a second snake, probably the mate to the first, in a second story room on the south side. He had evidently gorged himself with birds and was hard to dislodge. Two dead birds were found in the room from which I pulled him, one apparently an old one. Dead birds were also found in two other rooms and only four young birds remained alive. Apparently only two of the occupied rooms had escaped the snake, which I am inclined to think had ascended the pole during the previous night, by moonlight. This snake was larger than the first and was probably the female of the pair. The following day one of the young Martins was found dead near the base of the pole and the other three on the ground unable to fly more than a few feet. They were kept under observation all that day, and a day later were found well up in a tree near by, where the old birds continued to feed them for a period of two or three days. I was not aware that these birds leave the nest so long before being able to care for themselves, but, in my case, the old birds may have hurried them out in fear of another visit from a snake.

A number of the Martins returned several times to the house seemingly examining the rooms to see if any young birds were left inside and later were observed flying about the grounds, but at this date all have disappeared. But for the tragedy connected therewith I certainly would have derived a great deal of pleasure from my Purple Martin colony. I shall try it again next spring with the hope of better success and shall certainly try to provide effective measures to keep out snakes. A declaration of war against snakes in general has been declared at "The Sycamores", and none, great or small, will hereafter be spared.

I shall probably order a second house from you, with suitable pole, for erection on another part of my grounds early in the spring. I hope in this way to obtain two colonies for next season.

By investigation I have learned that there are a number of Purple Martin colonies in this county (Talbot), one being at "Wye House," the home of Mr. Howard Lloyd, another at the home of J. B. Dixon, and a third in the town of Easton. Yesterday I noted about twenty Martins on the telephone wires near one of these colonies and I presume that the birds are getting ready for an early departure.

I enclose two photographs of my Martin house, neither of which entirely pleases me. I have taken a third which is not yet developed. I am hoping it will be a better view than either of those enclosed. I will send you a finished copy of this last view in a few days.

Next summer I hope to be able to make a personal visit to all of the Martin colonies within a reasonable distance of my home and will endeavor to send you photographs of all I can obtain good views of.

With best wishes and with apologies for my delay in replying to your favor, I am

Very truly yours,

W. Scott Way.

When a wood pole is used for mounting a bird-house, the same should be stripped of its bark, leaving it smooth and hard. This operation will render it snake-proof, for the black snake does not ascend a tree by twisting its body around the same in a truly spiral manner, but progresses up the perpendicular side in a series of kinks, clinging to the coarse bark, and moving around the tree in its ascent.

Stripping a freshly cut pole of its bark will cause it to check badly with season cracks. To prevent this apply two coats of good lead or other paint mixed with linseed oil.

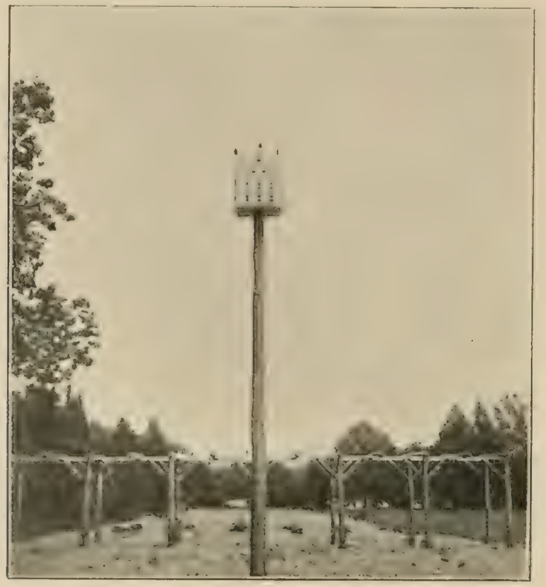


FIGURE 21

Another view of Mr. Way's Martin house, showing it to be some distance from the group of trees seen in the first picture, therefore the snakes could not have used the trees in reaching the house, or probably, even in locating it.

EASTON, Md., September 19, 1910.

I enclose herewith another later photograph of my Martin house, which I think is a better view of the house than the one from the same position sent with my last communication.

I am taking my house in for the winter, its present position being only a temporary one, and I will order an iron pole of you to place it on next spring. I should have done this in the beginning, but as my grounds were not permanently arranged I decided to use the wooden pole merely for this season. Probably I shall also order another house for a different location.

I find there are many Purple Martins in this county, and next season I shall take the trouble to hunt up some of the principal colonies and obtain photographs of them. Shortly after I wrote you last I found a very large colony in a small settlement of colored people on the outskirts of Easton. The house is a "homemade" and crude affair, not more than twelve feet from the ground and almost surrounded by trees. The owner of the house informed me that there had been more than one hundred birds in the colony, but I did not have time nor opportunity to verify his statement. But I was informed by others that the colony was a large one. I regret that I did not know of it until the end of the season.

A few days ago a lone Martin was found on my Martin house in the morning. He remained about half a day, feeding about the grounds, and then disappeared. Probably a straggler bound south. I shall be glad to have several copies of the supplement, when ready, as I shall try to work up a wider interest here in the Purple Martin, so that more homes may be put up for them.

Sincerely yours,
W. Scott Way.

On Snakes as Bird Destroyers, and their Power to "Charm."

Mr. Way's experience is the first instance of snakes entering Martin houses coming to my notice, and while owners of Martin colonies have less to fear from snakes than from cats and squirrels,—and possibly also owls,—every precaution should be taken to guard against a tragedy of this kind.

Snakes are very destructive to birds in general, and particularly to those species nesting on or near the ground.

I have found species of water snakes in, or about to enter, the homes of Kingfisher and Bank Swallow; and evidence of garter snakes and black snakes robbing ground nesting birds. I have found the latter species in the despoiled homes of Bluebirds, Woodpeckers and other hole nesting birds, as well as nests in bushes and on the ground. Once I found a black snake in the act of robbing a Brown Thrasher's nest of its eggs. The cries of the excited parent birds brought me to the scene, whereupon the snake was frightened away.

Several times we have found large black snakes on our premises, and while I dislike to kill them, I prefer, for the sake of the birds, to be rid of them.

Much has been said and written, pro and con, on the power of snakes to "charm" birds and animals. Just to what extent they are endowed with this power, I am unable to say beyond my own experience, several instances of which I will here relate.

While I wish it understood that I do not pose as a believer in the snake's power to "charm" into insensibility, nor to the point of doing what it pleases with its intended victim, yet it seems to have power to create an insane rage, or terrible excitement or fright on the part of the victims, causing them to act in a manner we do not observe at other times, when in imminent danger of destruction. It may be that the affected birds, or other creatures, realize their danger more forcibly, and destruction more certain, as the snake approaches stealthily and quietly, while they feel powerless to defend themselves, and merely become intensely excited in an effort to drive the intruder away.

I once saw (May 9, 1908) a small sized garter snake approach a nest of the Louisiana Water-Thrush (*Sciurus motacilla*), to within one foot, while the old bird sat perfectly quiet, watching the slowly moving serpent. With a stick I hurled the snake aside, whereupon the old Water-Thrush flew from the nest in great excitement, although their usual method is to drop to the ground, and with drooping wings, flutter and tumble over the rocky bed of the brook for some distance.

The Water-Thrush's nest contained six eggs, which would have made a fine meal for the snake, had my interference not prevented.

Reflecting on my past observations of birds in the presence of snakes, I had decided to follow the next opportunity to an undisturbed termination; but at an unguarded moment when this opportunity presented itself, I spoiled what might have been an interesting result.

It was, I believe, in the summer of 1908, while climbing up a bushy hillside, I heard an unusually excited Red-eyed Vireo (*Vireosylva olivacea*) in a small isolated clump of ash sprouts, growing around a stump. Going within ten feet, I could see a five foot black snake stretched upon the bending sprouts, two feet off the ground, while the old Vireo was flying from twig to twig quite near the serpent's head, — stopping occasionally, apparently to make sure the object of its dread was really alive, — all the time uttering, in rapid succession, her alarm notes. For the instant I forgot my former resolution, and seizing a rock, hurled it into the clump. My dog, who had come up by my side, leaped into the bushes when I threw, and the snake, dropping to the ground, scurried away through the grass, while the Vireo darted to a higher tree, still much excited.

My hasty interference brought a certain condition to my notice which to that moment I had not observed. The commotion caused by the crashing stone and leaping dog frightened more than a score of birds, of several species, from nearby bushes and other advantageous elevations surrounding the clump of ash sprouts, where they had been calmly watching, in silent excitement, the actions of the Vireo. Among these birds were Cardinals, several Vireos, Song and Field Sparrows, Chats, Yellowthroat, Tanager and Kentucky Warbler and such inquisitive species as Titmouse and Downy Woodpecker.

About twenty-five years ago, when I had more sympathetic feelings for cats than at the present time, we had a fine large black and white one which was considered a good ratter, One day I noticed her in the garden, acting very queerly. She was standing with head stretched up beside a hill of corn, intently watching something up among the fully grown stalks. Her gaze was steadfast, and her tail —"brushed" up, as a cat in anger,—was striking slowly from side to side.

As I had seen the cat in this position for some minutes, I went to investigate the cause of her peculiar actions, and found a black snake, fully six feet long, twining closely among the corn stalks, with his head dangling below his coiled body, and swaying back and forth in front of the cat, and not more than eighteen inches away.

I approached within ten feet, but neither cat nor snake saw me. I saw that the cat's eyes had a wild or frightened stare, her purring was distinctly audible, and she was steadily contracting and relaxing the claws of her fore feet. Excitement overtook me, and seizing a club, I brought it down over the snake in rapid blows which soon dispatched it.

The cat moved away in an unconcerned manner, but when showed the snake, she would move farther away. What would have happened to either snake or cat, was broken by my interference at a critical moment.

The nearest to bird "charming" by snakes I ever observed, was in 1892, and is herewith described, together with the black snake's method of killing and devouring young birds.

On June 12th, of the year stated, I found a nest of the Yellow-billed Cuckoo (*Coccyzus americanus americanus*) about ten feet up among some vines overhanging an elm sapling. I did not examine the specimens closely, but as they looked like freshly laid eggs, I left with the intention of returning later for a possible set of four eggs for my cabinet. Returning on the 19th, I was surprised to see, as I approached under the nest, about three feet of a black snake hanging from it and clinging to the vines. Even as I watched, his visible length slowly disappeared and I concluded that he was about ready to "collect" my intended eggs.

Reaching over, I gave the tree a gentle whack with my hatchet, and as I did so I was astonished to see the old cuckoo struggle from the nest and fly away. What caused her to calmly remain on the nest, while a three and one-half foot black snake coiled around her, I cannot say. It may be that the stealthy snake had gained his position unobserved by the bird, but certainly it was the rap I gave the tree that caused her to fly to safety.

Climbing a nearby sapling, where I could see in the nest, I observed that, instead of eggs, young birds were there, and these were having their lives squeezed out by the snake, which was coiling tighter all the time, with the two little nestlings' heads protruding above his shiny rings. All the time the snake was watching me closely, anon warning me by protruding his tongue, but not for an instant did he stop preparing for breakfast.

After a few minutes his coils began to relax, and with one long winding kink of his neck and forebody, he reached over to the nestlings and began swallowing the first one. The size of the young cuckoo was greatly out of proportion to the snake's head,—being at least three times as large, yet his jaws extended and slipped entirely over the bird. A great knot appeared in his neck, as the swallowing process forced the dead bird down into the snake's stomach. As the lump went *down* the serpent's neck, I felt a lump come *up* into my own throat as I witnessed the fate of the poor little baby cuckoos.

The same process was gone through in disposal of the second young, then his snakeship coiled himself on the nest, and turned his head over his shiny body, for a lazy repose. But I decided that this act should not be an end to my observations. Therefore I climbed from my cramping position and shook the snake from his position, but not until I had shaken the cuckoo's nest entirely away.

Upon the ground, the snake could not run, owing to the two great lumps in his body. He tried to defend himself by striking, but I soon had him killed and dissected. The young birds were covered with a slimy fluid, and had I not witnessed the recent killing and devouring, I might have thought them to have been in the snake's body for several hours.

A RESULT OF NON-SPRAYING OF TREES AND ENCOURAGEMENT AND PROTECTION OF BIRDS FOR A GOOD YIELD OF FRUIT.

These apples were grown under the guardianship of a large Purple Martin colony. No poisonous sprays were ever used on the trees, their care and protection being intrusted to the birds.

The apples shown in this picture number forty-one, having a total weight of twenty-one pounds, and filling a half bushel measure heaping full. They are of the Western Beauty or Summer Rambo variety, and the tree produced twelve bushels of this quality in 1911.

COPYRIGHT, 1911, BY J. WARREN JACOBS,
WAYNESBURG, PA

A RESULT OF NON-SPRAYING OF TREES, AND ENCOURAGEMENT AND PROTECTION OF BIRDS FOR A GOOD YIELD OF FRUIT.

[From "The Third Supplement to Gleanings No. 5, The Purple Martin and Houses for its Summer Home." by J. Warren Jacobs, Waynesburg, Pa., 1911.]

The good work done by martins for the protection of fruit trees can scarcely be estimated. Only the careful observer can appreciate the value of these and other insect-eating birds.

In former pamphlets I told of the nature of insect food, and of the immense quantities taken by the martins. In this brief chapter I wish to describe my success with vines and fruit trees, planted partly for ornamentation and partly for the fruit they might produce. The existence of these trees and vines, and my observations and experience with them, are so closely associated with that of my martins and other garden nesting birds, that I must take this opportunity to show to other city residents what they may expect from a proper encouragement of birds. The rural fruit grower, too, should bear in mind, that abundance of insect-eating birds will protect his growing fruit and save him the annoyance and expense of soaking his trees with poisonous liquids, which, to be of sufficient strength to exterminate the insects, must also affect the birds, either by driving away or killing those which feed largely upon these pests.

On page 22, "Gleanings No. 5, The Purple Martin and Houses for Its Summer Home," under head of "Food" of the martins, I mention remains of small beetles as being left in the nest rooms after the young birds take their flight.

This summer I found similar beetles infesting the bark of a young apple tree and sent some of them to Prof. H. A. Surface for identification.

Extracts from his reply are presented herewith.

DEPARTMENT OF AGRICULTURE,
DIVISION OF ZOOLOGY,
HARRISBURG, PA.,
JULY 8, 1911.

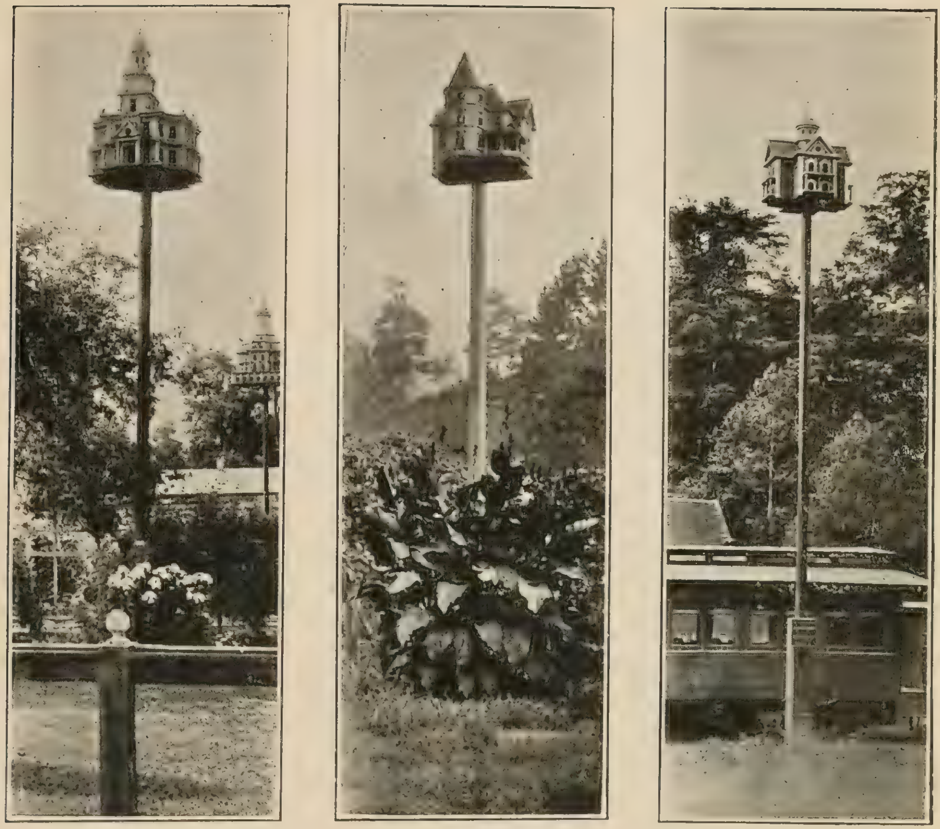
MY DEAR MR. JACOBS: The insects which you sent us are the Fruit-tree Bark Beetle. There is no good remedy for them. These are also called Shothole Borers or Bark Borers or Bark Beetles. I enclose herewith a circular concerning them. * * * *

It is very interesting to know that you have found that numbers of these Bark Beetles were fed to the young martins, apparently captured by the older birds while in flight. This is an important point in behalf of bird protection and especially martin colonization. The economic features of these birds should be emphasized. * * * * I congratulate you upon your success in the distribution of your martin houses. This is doing well and will grow.

Faithfully yours,
H. A. SURFACE,
Economic Zoologist.

On our residence grounds stands three martin houses, where in previous years, sometimes as many as eighty pairs of martins have nested. The past summer over forty pairs nested. The colony was established in 1896,—four pairs nesting. With each succeeding year the colony increased steadily until 1905, when more than half the two hundred birds arriving were discouraged from nesting by continuous cool, wet weather, and left the neighborhood, never to return. Since that date, my colony has never contained more than fifty nests. A larger number of birds arrive at the houses in early spring, but later, many of them go elsewhere to breed, presumably to the numerous new houses put up for them in the city or immediate vicinity.

One of these houses stands in the center of the lawn between my residence and one of the buildings in which our bird-house factory is conducted; one stands in the edge of the garden some eighty feet south of this one, and directly west of this is the third house, close the street and near the outspreading branches of large ornamental maple trees, which have not yet reached so near as to menace the house as a favorite summer home for the martins.



Jacobs Martin houses, where dwell the hosts of Purple Martins which go forth to cleanse the air of insect pests, ever ready to descend, with destructive effect, upon the foliage and vegetation below.

The left hand cut shows two of the houses on my grounds; the one in the foreground, a 45 room structure, and the one in the distance, near the right margin of the picture is a 66 room mansion. The tree branches spreading from the left, are those of a fall pippin apple tree. In this tree in 1911, two families of catbirds and one family of chipping sparrows were reared.

The central cut is a 34 room martin residence,—a favorite with the martins,—situated eighty feet west, or to the right, of the 66 room structure.

The cut on the right shows a 20 room martin house erected last year, in the green plot in front of the W. & W. R. R. passenger station, on the opposite side of the street from my property.

In the midst of this triangle, formed by the location of the martin houses, and partly sheltered by my residence, is a fine apple tree of the Summer Rambo variety, planted in 1887. For twelve years, this tree has been a prolific bearer of fine, large, delicious apples, ripening late in August. The quantity varies with seasonal favor, being on bottom land, May frosts sometimes curtailing the crop but the quality is always the same. The largest apples, for this tree, were produced in 1909, when many of them weighed thirteen and fourteen ounces. In the spring of 1910, a May freeze ruined the yield. In the present year, 1911, it produced the largest yield—about twelve bushels—the average size of the apples being slightly less than in 1909, when it produced fewer bushels of fruit. Many of the apples, this year, weighed nine and ten ounces, and at the final picking, August 24, when the remaining five bushels were taken off, a half bushel of selected specimens numbered forty-one and weighed twenty-one pounds—an average of over one-half pound each. More than half of the apples taken from the tree were of this size and quality.

Quite close the bird house factory buildings, and only a few yards from two of the martin houses are two "fall pippin" apple trees. One of these never was a very good bloomer, but this year it contains a good showing of fine, large green colored globes untouched by insects. The other tree, at this writing, August 28, is bending full of fine apples, just on the verge of taking on the golden hue.

Back of the factory buildings, and directly east of one of the martin houses, are three plum trees, the survivors of a row of such trees planted in 1897. One of these—a peach plum—has so repeatedly borne fruit that all its branches, including the topmost, droop like a weeping willow. About the middle of August, this year, three quarters of a bushel of plums were gathered from it, most of which were gathered while the picker stood upon the ground. The other two trees are of the "Shropshire damson" variety, and at this writing, August 28, the tall slender branches sway with their thickly set fruit, about ready for gathering.

Bordering the garden walks are numerous grape vines of the Concord, Niagara, Catawba and Pocklington varieties, from which an abundance of the finest bunches are gathered each year, some of the vines being thirty-four years old and still in fine healthy condition.

Over these trees and vines my martins catch much of their prey, but being aerial feeders, the whole credit for ridding the trees of insects cannot be given them, I must therefore name other species of birds which infest our lawn and garden, some of them living, during the summer, entirely within our premises. At blooming time in early May, our trees teem with the melody of bird-music of such varieties as yellow warbler, chipping sparrow and Baltimore oriole, the first two species nesting in the trees and shrubbery about the place, and the latter in the sycamores along the creek bank adjacent to our property. Robins, which are numerous, feed upon the ground. Along with the arrival of the species first mentioned, comes the catbird, which takes up its abode in the denser parts of the trees. At all hours of day they can be seen going through the branches of the trees or over the rose bushes and shrubbery. Here several song sparrows are found feeding on insect life; and among the grape vines and about the fences and exterior nooks of buildings, the Carolina wren regales himself on mosquitoes and other such insects which seek shelter of this kind. The bluebirds which nest in boxes in the more secluded parts of the garden, feed mostly over the garden. About mid-summer, the cuckoos appear in the trees searching for woolly caterpillars. These shy birds make their rounds in all the trees, several times daily, until September. Along with the appearance of the cuckoo comes the little goldfinch, mostly a seed-eating bird, to feed upon the lettuce seed and that of the sunflower, but they also go through the rose bushes as effectively as did the yellow warblers and chippy birds, earlier in the season. The shy little warbling vireo, a valuable insect destroyer, is also a frequenter of the fruit trees while in bloom, and later. Numerous cardinals come and go, and the chickadee is often here, once nesting in a post of a vine arbor.

Waynesburg, Pa. J. WARREN JACOBS.

Samples of Shropshire damson plums grown on the tree nearest the largest martin house. The leaves were carefully removed to show the thickly set plums.

The twig on the left was swaying within a few inches of a robins' nest from which a brood of four young had recently flown.

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